Five-Year Review Report

Second Five-Year Review Report

for

Hedblum Industries Site

Au Sable Township

Iosco County, Michigan

September 2004

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Iosco County, Michigan

September 2004

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9-30-04

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Five-Year Review Report

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List of Acronyms

AIAC	MDEQ Acceptable Indoor Air Concentrations
AOC	Administrative Order by Consent
ARAR	Applicable, Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
CLP	Contract Laboratory Program (EPA-approved contract laboratories)
COPC	Chemicals of Potential Concern
DCA	Dichloroethane
FSP	Field Sampling Plan
EPA	United States Environmental Protection Agency
EW	Extraction Well
FCOR	Final Closeout Report - documents completion of Remedial Action
FR	Federal Register
FS	Feasibility Study
FY	Fiscal Year
gpm	Gallons per Minute
HI	Hazard Index - an index of noncancer risk from long-term exposures
HRS	Hazard Ranking System
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MGD	Million Gallons per Day
MW	Monitoring Well
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
PCE	Perchloroethylene or Tetrachloroethylene
PCOR	Preliminary Closeout Report
ppb	Parts per billion or ug/L (water) and ug/kg (soil/sediment)
ppm	Parts per million, or mg/L (water) or mg/kg (soil/sediment)
PRPs	Potentially Responsible Parties
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAO	Remedial Action Objective

RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RP	Responding Party
RPM	Remedial Project Manager (U.S. EPA)
SARA	Superfund Amendments and Reauthorization Act of 1986
SDWA	Safe Drinking Water Act
SMCL	Secondary Maximum Contaminant Level
SOW	Statement of Work
SRD	Substantive Requirements Document
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TBC	To Be Considered
TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
TCL	Target Compound List
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
UAO	Unilateral Administrative Order
UST	Underground Storage Tank
VAS	Vertical Aquifer Sampling
VOC	Volatile Organic Compound

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Executive Summary

The Hedblum Industries Site, i.e., the manufacturing portion of the property and immediate surroundings ("the Site") is situated on 10 acres in a mixed-use, industrial and residential area in Au Sable Township, Iosco County, Michigan. From 1958 through 1985, the Site was leased to a series of industrial firms that manufactured automobile parts. The Site first came to the attention of the Michigan Department of Natural Resources (MDNR), Water Quality Division, during a routine inspection of the facility in 1972. At that time, Thomson Industries was assembling anti-rattling devices for the automotive industry and discharging the cooling and rinse waters from the plant directly onto the ground. The MDNR learned that from 1968 to 1972, Thomson Industries had dumped approximately 4,000 gallons of trichloroethylene (TCE) from a degreasing tank onto the ground. Samples from several residential wells indicated the aquifer was contaminated with TCE. As a result, the state recommended that local residents not use their wells. The affected residents replaced their contaminated wells with deeper ones in an attempt to tap an uncontaminated water supply.

By 1978, the Township of Oscoda had extended water lines into the Au Sable Heights subdivision to provide an alternate water supply to the subdivision, although some property owners elected not to be connected to the Oscoda water system. The County Health Department continued to assess conditions at the Site. In 1981, the state installed seven monitoring wells, determined that the groundwater flow beneath the site was to the northeast, and confirmed volatile organic compounds (VOC) contamination of the groundwater. In 1985, the Hedblum Industries property was purchased by the Aircraft Tool Supply Company, which currently produces aircraft parts at the Site. About 9,530 people live in the Au Sable and Oscoda Township areas. The closest residence is about 350 feet from the Site. Most of the population of the towns of Oscoda and Au Sable live within a three-mile radius of the Site.

After a careful evaluation of several alternatives, the United States Environmental Protection Agency (EPA) explained how the Site contamination would be addressed in the September 29, 1989 Record of Decision (ROD). The remedial action (RA) included: extraction, treatment, and monitoring of contaminated groundwater in the Au Sable Heights subdivision; abandonment of six groundwater monitoring wells; and collection and analysis of onsite soil samples. The construction of the groundwater cleanup treatment system was completed in 1992 and the groundwater treatment has been ongoing since 1993.

The EPA is conducting this second site-wide five-year review of the RA for the Hedblum Industries Site, as mandated by Section 121(c) of CERCLA, and amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). The June 2001 guidance, *Comprehensive Five-Year Review Guidance,* OSWER No. 9355.7-03B-P, provides that EPA will conduct policy reviews no less often than five years at sites where a remedial action, upon completion, will not leave hazardous substances, pollutants or contaminants on site above levels that allow for unlimited use and unrestricted exposure.

The trigger for this policy second five-year review was the completion date (September 30, 1999) of the first five-year review for the Site. The first five-year review concluded that the remedy was executed initially in accordance with the requirements of the ROD, but that the groundwater extraction and treatment rate was reduced too far below design capacity to achieve the planned health and environmental benefit within the projected five years operation time. It was also possible that portions of the plume may have escaped the capture system during the period of sub-optimal extraction rates. Since it was reported to EPA that no residents of the Au Sable subdivision were being exposed to groundwater, the remedy was assessed to be protective of human health and the environment.

The data collected and evaluated during this second five year review indicate that the remedy is now currently extracting and treating contaminated groundwater according to design and is anticipated to remain functional in the future. EPA and MDEQ have determined that additional monitoring is needed to determine whether the remedy is effectively capturing the current plume configuration, and whether additional VOC sources exist in the soil at the original dumping area and/or beneath the Au Sable Heights subdivision. With assistance from Au Sable Township, EPA identified five residences still using private wells for potable water. These wells were subsequently sampled on September 7, 2004. The preliminary results will be available on September 30, 2004. Significant public health benefits have been achieved to date by interrupting current and/or potential future exposure pathways such as ingestion of and direct contact with groundwater.

Operation and maintenance activities have been generally effective and are ongoing as prescribed in the RA Statement of Work. This includes groundwater and effluent monitoring until such time as the data indicate it is no longer necessary. Evaluation of the effectiveness of the remedy will continue during future five-year reviews until contamination and/or its associated risks are no longer present in the Site groundwater.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Hedblum Industries Site		
EPA ID *(from WasteLAN)*: MID980794408		
Region: 5	**State:** MI	**City/County:** Au Sable Township, Iosco County

SITE STATUS	
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)	
Remediation status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete	
Multiple OUs?* ☐ YES ☒ NO	**Construction completion date:** 8/16/1993
Has site been put into reuse? ☐ YES ☒ NO (The manufacturing portion of the Site has never ceased operating)	

REVIEW STATUS	
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: Sheila A. Sullivan	
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA, Region 5
Review period:** 4/17/2004 to 9/14/2004	
Date(s) of site inspection: 7/21-22/2004	

Type of review:
☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

Review number: ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify)

Triggering action:
☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____
☐ Construction Completion ☒ Previous Five-Year Review Report
☐ Other (specify)

Triggering action date *(from WasteLAN)*: 9/30/1999

Due date *(five years after triggering action date)*: 9/30/2004

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:
The following issues were identified during the July 21-22, 2004 inspection:

1) Five residences in the Au Sable Heights subdivision still use private wells for drinking water. EPA sampled the wells on Sept.7, 2004 to determine whether an alternate water supply is needed.
2) The plume underlying the Site is not well defined and has potentially changed morphology during the years of low extraction rates. Plume definition is needed. Further, hydrogeological investigation is needed to determine whether additional sources of contamination exist, i.e., DNAPLS, near the original location of TCE disposal or beneath the subdivision.
3) The groundwater extraction rate over the past five years has shown a great deal of variation from 1.4 to 112 gpm, extending the operation of the pump and treat system beyond the five year estimate. The extraction wells are treated with chlorine to break down accumulated iron and iron bacteria on the pump intake screen and piping. The system flow rate should not be allowed to fall significantly below the design flow rate for an extended period of time.
4) The electrical controls behind the extraction well system is inefficient and outdated.
5) The SRD requirements for monthly toxicity tests are not being conducted on a regular basis by the RP.
6) Improved reporting methods providing more detail are necessary
7) TCE sample dilution has increased the detection limits for some compounds above clean up criteria

Recommendations and Follow-up Actions:
1) If the results show unacceptable risk, the residence must be connected to the regional water supply.
2) Install the necessary piezometers, sentinel wells, monitoring wells; perform VAS and/or install soil borings. Collect quarterly hydraulic data from all existing monitoring wells/piezometers.
3) If the system flow rate is trending to a level below the design flow rate, maintenance should be performed as soon as possible. The agencies recommend annual, rigorous well rehabilitation using vigorous acid and chlorine surging using a drill rig or well maintenance rig.
4) The RP is planning to convert to a wireless control and telemetry system which will improve the efficiency of the system.
5) Continue to perform monthly toxicity testing on influent and effluent
6) Provide weekly log-book inspection sheets including detail on well maintenance and individual pumping rates.
7) Notify laboratory to correct this problem

Protectiveness Statement:
A protectiveness determination for the remedy at the Hedblum Industries Site cannot be made at this time until further information is obtained. Information supporting a hydraulic capture zone analysis was provided to EPA contractor Subterranean, Inc. The analysis will determine whether the contamination plume is effectively captured by the pump and treat system operating at the Site. Also, results from the residential well monitoring conducted on September 7, 2004 will indicate whether exposure to groundwater contaminants has occurred. In addition, preliminary screening indicates that further data collection activities, such as soil gas sampling, in the area of the Au Sable Heights Subdivision showing the highest groundwater concentrations may be needed. It is expected that these analyses will be completed by December 3, 2004, at which time a protectiveness determination will be made soon thereafter.

Other Comments:
None

Five-Year Review Report

I. Introduction

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of such reviews are documented in the site-specific five-year review reports. In addition, five-year review reports identify issues or deficiencies, if any, found during the review process for the site, and provide recommendations to address or correct them.

The United States Environmental Protection Agency (EPA) is preparing this site-wide five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The EPA interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The EPA, Region 5 has conducted a site-wide five-year review of the remedial action (RA) implemented at the Hedblum Industries Site in Au Sable, Michigan. This review was conducted for this Site from April 2004 through September 2004 by the EPA Remedial Project Manager (RPM), with assistance from the Michigan Department of Environmental Quality (MDEQ) Site Manager and Site geologist. This report documents the results of the review. As part of this review, the RPM reviewed all data collected under the regular monitoring under operation and maintenance (O&M) for the Site to evaluate the current Site status.

This is the second such site-wide five-year review for the Hedblum Industries Site. The first five-year review was completed on September 30, 1999; the triggering action for that policy review was the completion date of the Preliminary Close Out Report (PCOR) of August 16,

1993, as documented by EPA's WasteLAN database. EPA's policy changes for consecutive reviews re-set the due date for this second review to five years from the completion date of the first review. Hence, the due date is September 30, 2004. This policy five-year review was specifically activated by the presence of hazardous substances, pollutants and contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure. The RA will require more than five years to complete; however, upon its completion, the hazardous substances, pollutants and contaminants will be remediated to allow for unlimited use and unrestricted exposure.

II. Site Chronology

TABLE 1 - CHRONOLOGY OF SITE EVENTS

Event	Date
Site facility, owned by Dasco Products, was leased by various industrial firms to manufacture automobile parts	1958 to 1985
Thomson Industries manufactured anti-rattling devices for automotive industry. During this time, they dumped about 4,000 gallons of TCE onto the ground. Spray tank rinse water and cooling water were similarly discharged.	1968 to 1972
Thomson Corporation merged with Amtel, Inc. to become the Thomson Company, Division of Amtel.	1971
MDNR first noted the improper discharge of waste waters onto the ground during an inspection	December 1972
MDNR samples residential wells east and northeast of facility, finding TCE in two wells of the Au Sable Heights Subdivision	April 1973
Hedblum Industries purchases the assets of Amtel's Thomson Division	May 1974
Two more residential wells in AuSable Heights show TCE contamination.	February 1975
The City of Oscoda extended water supply service into the Au Sable Heights subdivision	September 1978
38 55-gallon drums of waste TCE and other compounds are found behind the plant. Arrangements are made to remove them. MDNR ordered Hedblum Industries to stop the discharge of its cooling water onto the ground	October 1979

Event	Date
Underground tank on the east side of the plant is found to contain TCE, 111-TCA and PCE	July 1980
The MDNR installs seven monitoring wells around the plant	May 1981
The seven Oscoda Township wells are sampled several times showing trace levels and largely negative results.	March 1982 - August 1985
Site proposed for National Priority (NPL) List	December 30, 1982
Site finalized on NPL	September 8, 1983
Dasco Products transfers property title to Aircraft Tool Supply company, the present-day owner	September 1985
Administrative Order by Consent signed between PRPs, EPA and MDNR compelling PRPs to conduct the Remedial Investigation/Feasibility Study (RI/FS)	May 11, 1987
EPA-lead RI/FS conducted	May 21, 1986 to September 29, 1989
EPA issues Proposed Plan describing the selected remedy: extraction and treatment of groundwater via granular activated carbon and additional soil investigation	July 1, 1989
Record of Decision (ROD) documenting the selected remedy is signed	September 29, 1989
Unilateral Administrative Order (UAO) issued by EPA compelling PRPs to conduct Remedial Design and Remedial Action (RD/RA)	January 4, 1990
EPA Emergency Response Contractor samples ten residential wells	February 7, 1990
Preliminary RD report submitted to EPA	January 29, 1992
Additional soil investigation conducted as per the ROD	June 12, 1992
EPA approves RD	September 22, 1992
PRPs begin on-site Remedial Action (RA) construction	December 16, 1992
MDEQ issues Substantive Requirements Document (SRD) for wastewater discharge from the Hedblum Site to the bay	May 21, 1993
RA field activities completed; Pre-final inspection conducted	July 20, 1993
Preliminary Closeout Report signed signifying construction completion; system begins operation	August 16, 1993

Event	Date
State support Agency Cooperative Agreement Grant awarded to MDEQ	August 16, 1993
Michigan Governor John Engler issued Executive Order 1995-18, separating environmental and natural resource functions into two separate departments. The site remediation program moved to MDEQ	June 1995
MDEQ issues revised SRD with reduced monitoring requirements	April 15, 1996
First Five-Year Review Completed	September 30, 1999
EPA Preliminary Site visit	May 18, 2004
Public notification of 2nd Five-Year Review	June 28, 2004
Second Five-Year Review Site Inspection	July 20-21, 2004
Residential well sampling conducted for those five residents using private supplies.	September 7, 2004
Second Five-Year Review completed	September 30, 2004

III. Background

Physical Characteristics

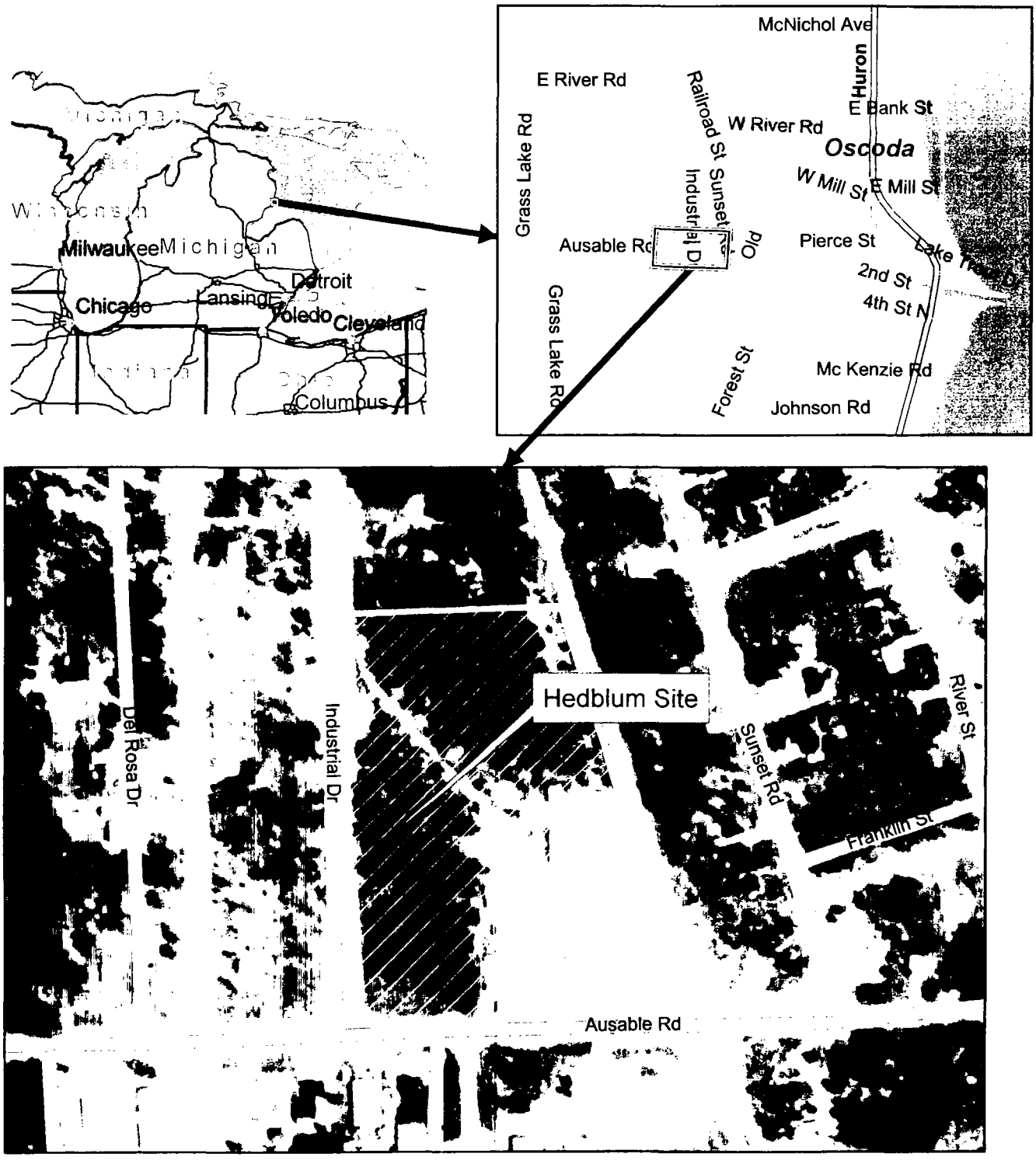
The Hedblum Industries Site at 1000 Au Sable Road (Old U.S. 23), is located in Au Sable Township, about one mile southwest of Oscoda, Michigan and just northeast of the intersection of Industrial Boulevard and Old U.S. 23 in Iosco County (see Figure 1). The Site property or "the Site"currently owned and occupied by Aircraft Tool Supply (ATS) Company consists of a manufacturing facility situated on 10 acres of land in an industrial park surrounded by a mixed-use industrial, commercial, and residential area. The 10-acre Site is in the designated industrial park area and is openly accessible- - there are no fences or markings to distinguish the property boundaries. The Site is bordered on the east by the Detroit and Mackinaw railroad tracks. These tracks are used about 2-3 times per week. There are scattered residences around the Site, mainly in an area called the Au Sable Heights subdivision on the eastern and northeastern property border. Lake Huron is located 1.2 miles east of the site. The AuSable River, approximately 0.8 miles to the east, flows through the town of Oscoda into Lake Huron. A 3,000-acre unit of the Huron National Forest is located south, southwest and west of the Site. Contaminated ground water flows in a northeasterly direction from the Site, through a portion of the Au Sable Heights subdivision to the east before reaching a bayou, also known as the Dead Au Sable River, that connects to the Au Sable River. A swamp area is immediately south of the bayou. Wurtsmith Air Force Base is four miles northwest of the Site in the City of Oscoda (see Figure 2).

Land Resources and Use

Historically, the communities of AuSable and Oscoda began as lumber and milling towns. Perfectly situated near a lumber source- - the Huron National Forest, which now provides trails and numerous recreational opportunities, and a transportation system- - the AuSable River was used to float lumber downstream to the Au Sable mills and Lake Huron docks, is now a National Scenic River which flows through the town of Oscoda into Lake Huron. The river is now used recreationally for boating and organized canoe races. A devastating fire in 1911 almost completely destroyed the businesses, mills, factories and housing stock of Au Sable and Oscoda. Over the next 40 years, the prosperity rebounded when the area became redefined by an army air field, later known as Wurtsmith Air Force Base (AFB). The base was closed by the Department of Defense in 1993 and the communities have adjusted to the loss, utilizing the base infrastructure for public and private needs.

The communities of Au Sable and Oscoda are shifting toward a service-based economy, with retail and tourism-related jobs rather than a manufacturing-based economy. As of the 2000 census, about 9,530 people live in the AuSable and Oscoda Townships. Au Sable's population was 2,230, decreasing slightly since the previous census, due to the closing of Wurtsmith AFB. However, an increase in the overall Au Sable population (1.6% annually) is predicted. As the area provides numerous recreational opportunities, such as boating, fishing, swimming, hiking, etc., about 1/3 of township inhabitants are not permanent residents, occupying their properties on

Hedblum Site
AuSable Township, MI



Plot created by Pranav U. Raval U.S. EPA Region 5/10/2004
B & W Image

FIGURE 1

HEDBLUM INDUSTRIES SITE
AUSABLE, MICHIGAN

- **Extraction_&_Monitoring_Wells**

FIGURE 2

Created by Eva Sinha US EPA Region 5 09/27/04

a seasonal or occasional basis. During the summer tourist season, the resident population can easily double or triple.

As mentioned, the land surrounding the Hedblum Site is mixed use and includes light industrial, commercial and residential uses. The Site itself is located within an industrial park zoned for industrial use. It is possible that a shift in land use to residential could occur since there are residential areas nearby. Some small businesses lie across Au Sable road to the south. The closest residence is about 350 feet from the Site. Most of the population of Oscoda and Au Sable live within a three-mile radius of the Site. A small subdivision (15-20 residences) lies to the west and northwest of the Site. A larger residential area, the AuSable Heights Subdivision, is located across the Detroit/Mackinaw railroad tracks and to the east and northeast of the Site. The subdivision geographically separates the Site from the Au Sable bayou and swamp (see Figure 3).

Water service in Au Sable Township is provided through the Huron Shore Regional Water Utility (HSRWU), an authority comprised of seven municipalities including Au Sable and Oscoda Townships. A regional water transmission main runs parallel to U.S. 23. Township water mains tie into the transmission main and the township assumes the construction and maintenance of the lines. The water treatment facility is in Baldwin Township and has the capacity to produce 5 million gallons per day (mgd). Current demand is half of this amount. Au Sable accounts for 16-19% of the system consumption (see Figure 4).

The Au Sable Heights subdivision is comprised of about 90 residences, each having a private well. At this time, all but five residences have elected to connect to the regional water supply due to the groundwater contamination plume still underlying the area. The bayou containing swampy land and backwaters from the Au Sable River and an unnamed creek, is used for fishing, swimming and boating and comprise the northeastern boundary of the AuSable heights subdivision. The Hedblum Industries Site is currently owned by ATS. This company is a small machining and mail order operation which does not appear to generate hazardous waste, recycling used engine oil and use a small amount (4 gal/year) of mineral spirits in their operation.

History of Contamination

From 1958 through 1985, the Hedblum Industries Site was leased to a series of industrial firms that manufactured automobile parts. The site first came to the attention of the Michigan Department of Natural Resources (MDNR), Water Quality Division, during a routine inspection of the facility in 1972. At that time, Thomson Industries was engaged in the assembly of anti-rattling devices for the automotive industry. Cooling and rinse waters were discharged from the plant directly onto the ground. During another inspection, the MDNR was informed that every two weeks from 1968 to 1972, Thomson Industries had dumped approximately 40 gallons of trichloroethylene (TCE) from a degreasing tank onto the ground. The state estimates that 4,000 gallons of TCE were dumped over this four-year period.

Initial Response

In 1973, samples from several residential wells indicated that two of them were contaminated with TCE. As a result, the state recommended that local residents not use their wells. The affected residents replaced their contaminated wells with deeper ones in an attempt to tap an uncontaminated water supply. Two more wells that were found to be contaminated in the Au Sable Heights area in 1975 were replaced with deeper ones.

A groundwater study prepared by Soils and Materials Engineers, Inc.on behalf of the potentially responsible party (PRP) Amtel, Inc. in 1976 concluded that Hedblum Industries appeared to be the source of the contamination. Though the company did not concede its responsibility at the time, it agreed to work with MDNR on a case by case basis to evaluate its potential legal liability. In 1977, TCE contamination was found in the company's water supply wells, cooling water discharge, and additional residential wells in the Au Sable Heights subdivision. By 1978, the City of Oscoda had extended water lines into the Au Sable Heights subdivision and began providing an alternate water supply to the subdivision. Out of 90 residences, 69 elected to be connected to the Oscoda water system. In 1979, the MDNR ordered Hedblum Industries to cease discharging cooling waters onto the ground. The Oscoda County Health Department continued to assess conditions at the Site and sampled liquids contained in an underground storage tank near the northeastern side of the Site in 1980. Upon finding TCE, 1,1,1-trichloroethane (TCA) and tetrachloroethylene (PCE), the tank was emptied, excavated and removed. In 1981, the MDNR installed seven shallow monitoring wells at and around the Site and determined that the groundwater flow beneath the site was to the northeast toward the Au Sable Heights subdivision. Further, they confirmed solvent (TCE, PCE, TCA, and chloroform) contamination of the groundwater and soil in the area. In 1985, the Hedblum Industries property was purchased by Aircraft Tool Supply (ATS) Company, which currently produces aircraft parts at the Site.

Basis for Taking Action

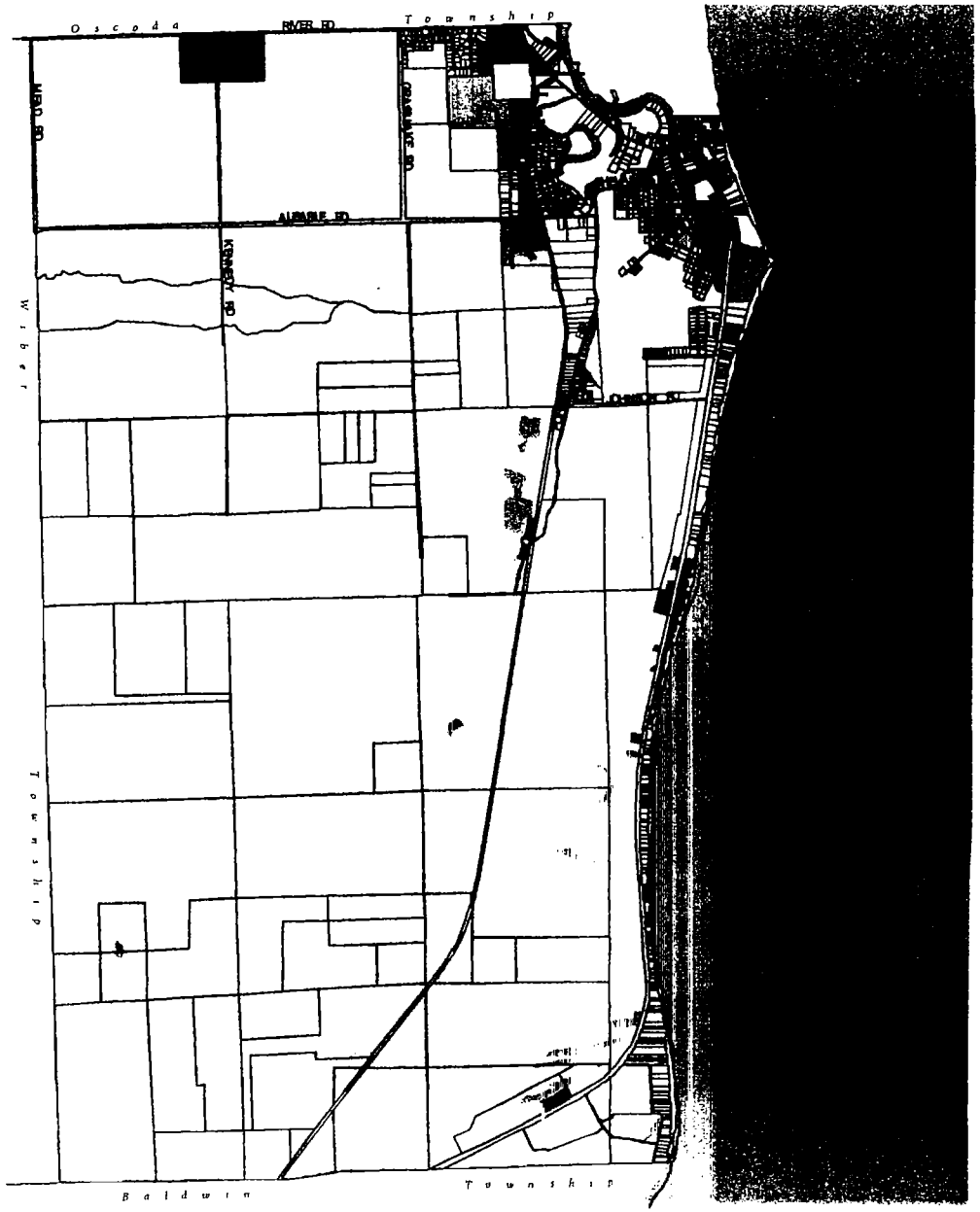
Groundwater and soil are contaminated with volatile organic compounds (VOCs), including TCE. Surface waters of the bayou northeast of the Au Sable Heights subdivision are contaminated with VOCs, including TCE and vinyl chloride. Residents of Au Sable Heights who use private wells may be exposed to contaminants when drinking or using groundwater. Since onsite groundwater flows northeast toward the bayou, area residents may be exposed to site-related contaminants when coming into direct contact with the bayou's surface water and sediments. Contaminants could migrate into the Au Sable River through sediments and surface waters of the bayou and a creek that feeds into the river.

In response to these threats and pursuant to 40 CFR 300.68, EPA began a Remedial Investigation and Feasibility Study (RI FS) in January 1987 utilizing the REM II Contractor Camp Dresser & McKee, Inc. (CDM), Chicago, IL (U.S. EPA Contract NO. 68-01-6939). As per the Statement of Work (SOW) for the RI FS, the RI which was completed in February 1989,

- Single Family Residential
- Multiple Family Residential
- Commercial
- Institutional
- Industrial
- Agricultural
- Recreation
- Cemetery
- Open Space
- Road Right-of-Way
- Transportation/Utility Right-of-Way

0.25 0 0.25 0.5 0.75 Miles

Note: Property boundaries shown were digitized from 1937 aerial photographs and do not accurately represent legally defined parcel boundaries. They are intended as an aid for visual reference only.



AUSABLE TOWNSHIP MASTER PLAN

Land Use in 2003

Data Source: Beckett & Raeder Inc., 2003

FIGURE 3

Sewer
Water

0.25 0 0.25 0.5 0.75 Miles

AUSABLE TOWNSHIP MASTER PLAN

Water & Sewer Lines

Data Source: AuSable Township

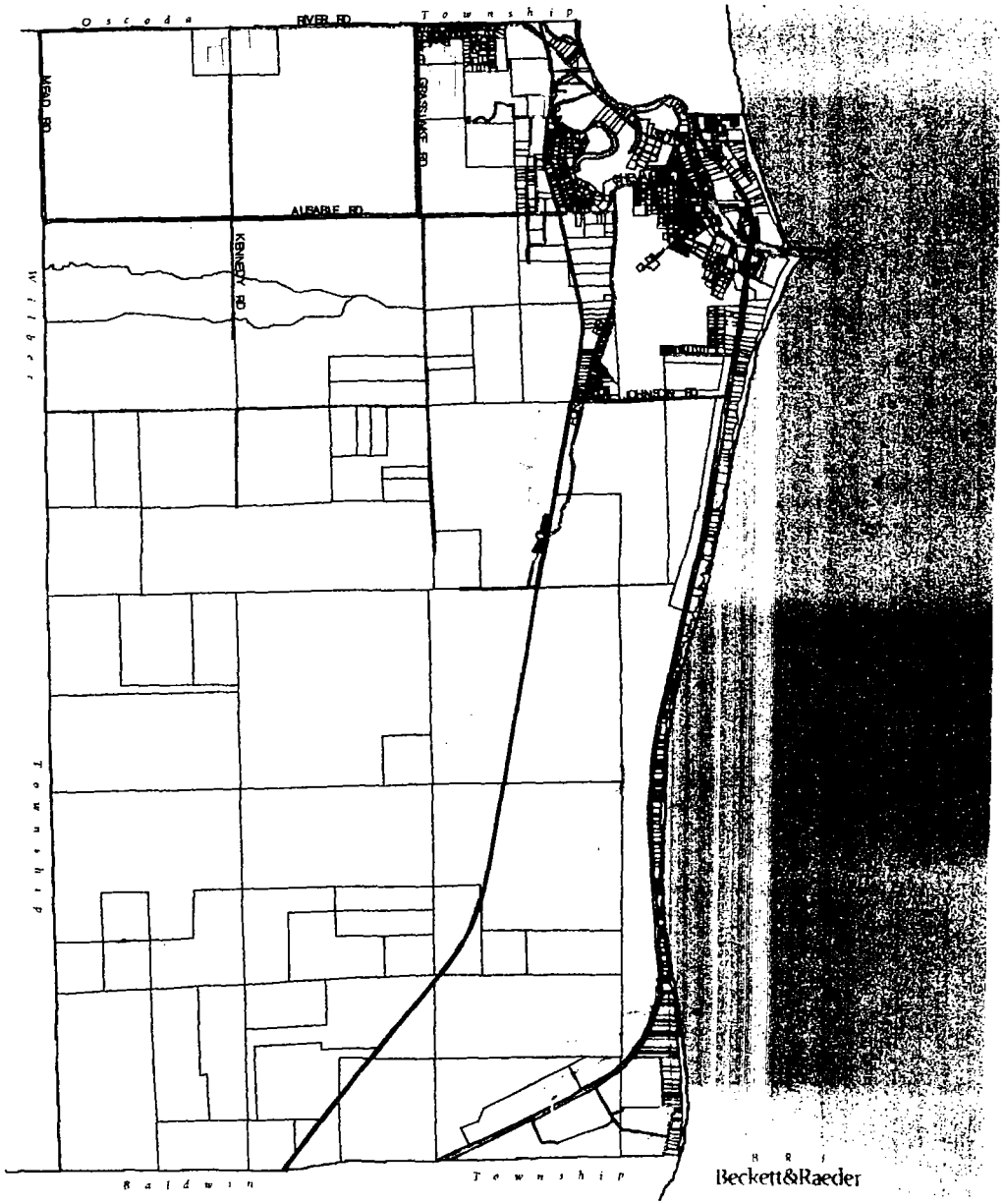


FIGURE 4

included: a full characterization of on-site physical features; a determination of the waste characteristics; the assessment of the extent and magnitude of contamination at the Site and in the Site vicinity, including nearby surface waters and residential wells; the definition of contaminant migration pathways from the Site; and, the assessment of public health and environmental risk. This involved conducting: a site surveying and topographical mapping; a subsurface electromagnetic survey to delineate the contaminant plume; a soil gas survey to determine monitoring well placement; soil, surface water, and sediment sampling; groundwater monitoring well installation and sampling; a residential well sampling investigation (and magnetometer surveys); and an investigation of the Site hydrogeology, soil, sediments, surface water, and air. The results of the RI investigations are briefly summarized by media in the following paragraphs.

The hydrogeologic investigation showed glacial deposits 200-300 feet thick beneath the Site. Underlying these deposits are bedrock formations of shale, sandstone, and limestone. The deposits consist of two distinct units - clay and overlying sand and gravel. The thickness of the clay layer is unknown but it is at least 20 feet thick at MW-8. Literature indicates the clay unit in this area is at least 125 feet thick and may be as much as 250 feet thick. Its relative imperviousness easily prevents the downward flow of groundwater. The sand and gravel unit ranges from 45-50 feet thick on-site and west of the bayou to about 30 feet thick east of the bayou. The middle clay unit prevents any significant hydraulic connection between the lower bedrock unit and the uppermost sand and gravel unit. The regional discharge area near Lake Huron further shows the gradients are upward, so bedrock aquifers are unaffected. According to the literature, the bedrock water is likely to be salty, hence no wells in this area tap the bedrock aquifer. The aquifer of concern is the unconfined sand and gravel unit as several residences downgradient of the Site still use private wells tapping this aquifer. The RI determined that groundwater flows in a northeasterly direction toward its discharge area in the Au Sable bayou. The hydraulic gradient through the Site in the direction of groundwater flow was estimated to be 12.5 feet/day.

Groundwater

The groundwater investigation involved the installation of 11 monitoring wells consisting of five well nests and one background well. These wells were used in conjunction with the seven existing on-site monitoring wells placed by the MDNR, off-site abandoned residential wells, existing residential wells and the City of Oscoda's wells (see Figure 5). Two separate sampling rounds were conducted in March/April and July of 1987. Regarding the residential sampling, 17 wells were sampled during the first round; three of these were connected to the city wells but hadn't removed their piping. Nine residences were not connected to the city supply and were still using their wells for all potable uses. Five residences were connected to city water and had abandoned their private wells. The number of samples was reduced during round 2 and included only those residents in the areas of concern. During round 1, the city wells closest to the Site were sampled, this involved five of the seven wells. The five city wells were resampled in a second round due to the presence of trace VOCs. All monitoring wells, including MDNR wells, were sampled.

Several heavy metals were detected at levels above drinking water standards from both onsite and offsite monitoring wells. Elevated levels of lead and zinc were found in the seven MDNR onsite monitoring wells and were likely due to well construction. Elevated levels of antimony, manganese, and mercury were found in monitoring wells northeast of the site. Manganese was found in 8 of 17 residential wells at levels slightly above drinking water standards. However, there was no evidence that inorganic contaminants found in groundwater at or near the Site was due to Site activities.

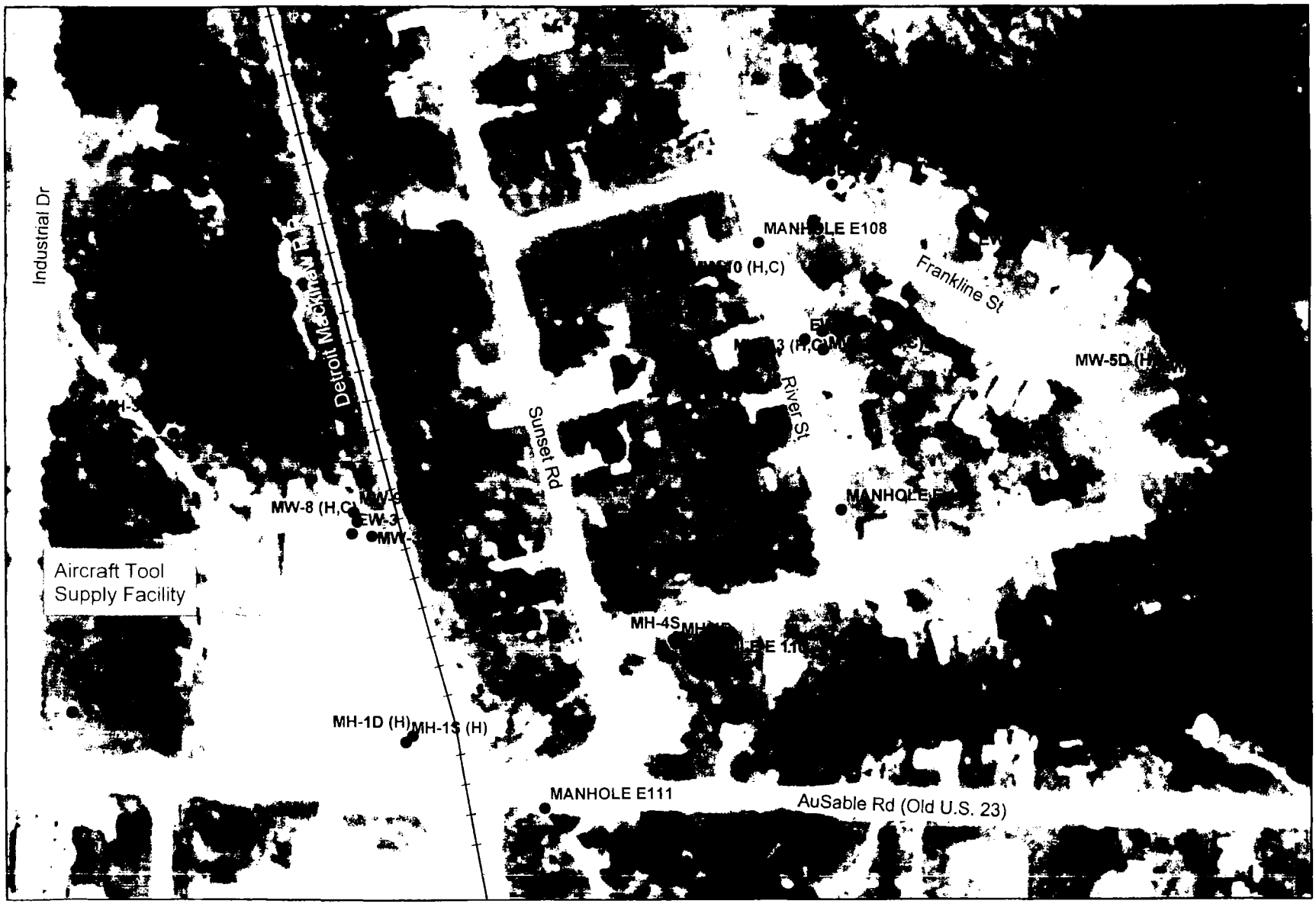
VOC contamination in groundwater is present at the Site and at the AuSable Heights subdivision. The onsite wells indicated contamination in the low ppb range. The offsite wells at the northern and eastern edge of the plume also showed low levels. Monitoring wells 12 and 13 in the middle of the Au Sable subdivision showed VOCs ranging in the low ppb to 4,880 ppb TCE and 3,080 ppb for TCA along with several degradation products. These values exceeded the U.S. EPA primary drinking water Maximum Contaminant Levels (MCLs) of 5 parts-per-billion (ppb) and 200 ppb respectively and thus appeared to be in the center line of the plume. The major source of contamination appears to be the TCE dumping area on the north side of the building. Though groundwater contamination was found at the Site just east of the plant and in the eastern section of the subdivision, the residential wells sampled between these two areas did not show contamination. Further, the contaminant concentrations in the groundwater beneath the subdivision are higher than those at the Site itself. This information suggested that the subsurface contamination at the Site was not an ongoing source of contamination responsible for the subdivision groundwater contamination. A sampling of residential wells in 1990 found no VOC contaminants above detection limits.

The moderate levels of TCE and TCA found near MW 12 and 13 have persisted over a time period inconsistent with simple transport of a slug of dissolved contaminants. If this were the case, then solvents dumped at the Site and entering solution would be carried with the groundwater at a velocity of 12.5 ft/day, they would have traveled to or below the bayou in less than 100 days, notwithstanding adsorption and desorption processes due to the low organic carbon in the aquifer. If solvent dumping stopped in 1972, all VOC contamination would have cleared the study area by the time of the ROD. The explanations for the distribution and persistence of groundwater contaminants posed by the RI were the following:

The presence of clay lenses in the aquifer containing higher organic carbon would adsorb the VOCs and act as a physical barrier to VOC solute migration. VOCs could form highly concentrated small pools in localized clay lense depressions and slowly re-dissolve into the groundwater or could be flushed by the clay barrier.

A second explanation is that the VOCs at the leading edge of the plume may have diffused out of active pore spaces into dead or inactive pore spaces in the aquifer. Solutes in the dead pore spaces, estimated to comprise one-third to one-fourth of the total pore spaces of the aquifer, are essentially trapped and would not move with the groundwater. Once the contaminant plume has moved through the aquifer, the trapped solutes would slowly move back into the active pore

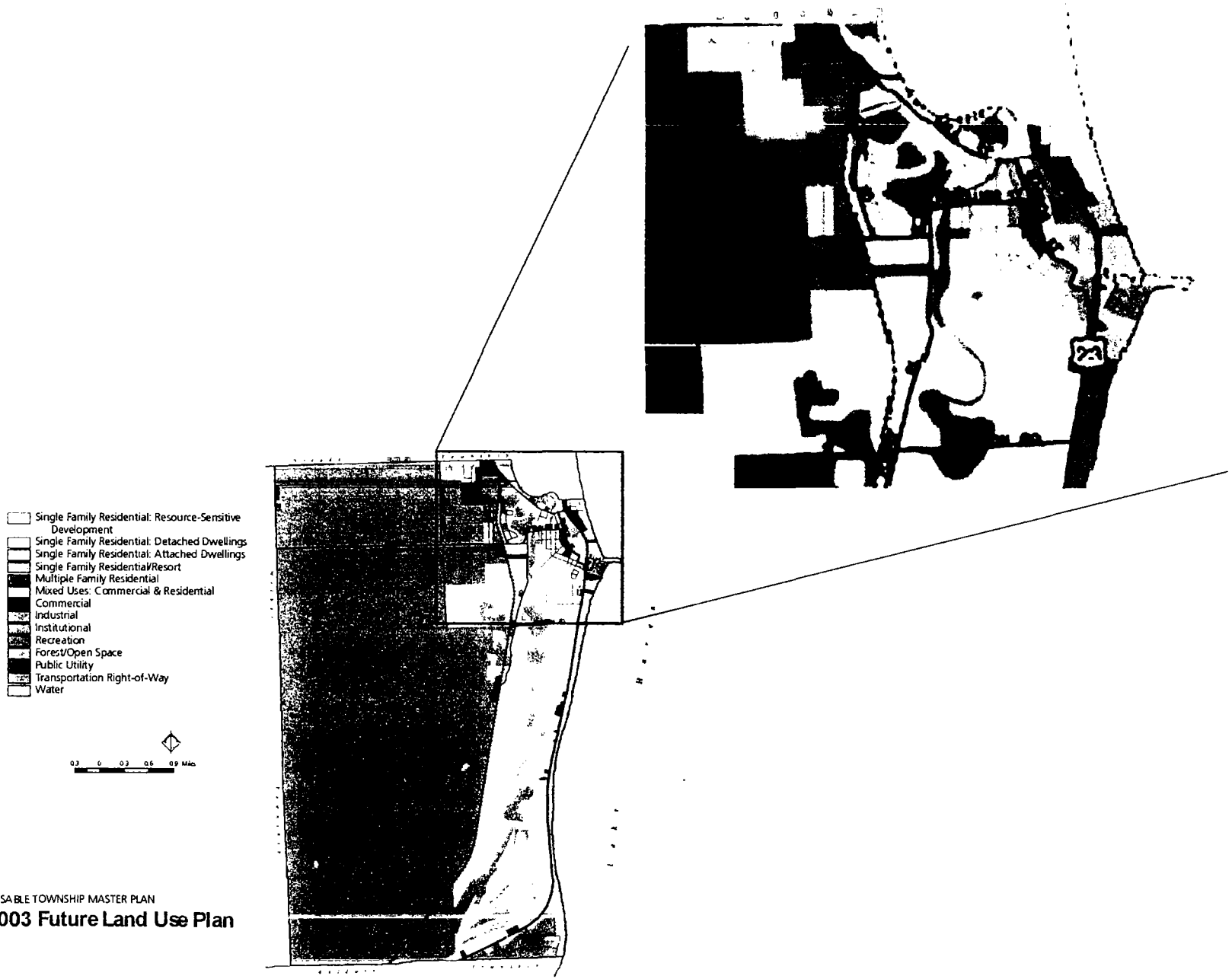
HEDBLUM INDUSTRIES SITE
AUSABLE, MICHIGAN



- Extraction_&_Monitoring_Wells

FIGURE 5

Created by Eva Sinha
US EPA Region 5 09/27/04



AUSABLE TOWNSHIP MASTER PLAN

2003 Future Land Use Plan

FIGURE 7

spaces along a concentration gradient.

The major routes of exposure evaluated in the risk assessment included ingestion of groundwater and inhalation of volatile chemicals from the groundwater seep– the location where the groundwater discharges into the bayou. TCE and carbon tetrachloride posed the greatest ingestion risks. Inhalation risks were generally lower, with the greatest risk posed by vinyl chloride. The major groundwater contaminants of concern to human health at the Hedblum Site were the following:

Organics

1,1-Dichloroethane
1,1-Dichloroethene
trans-1,2-Dichloroethene
Carbon Tetrachloride
1,1,1-Trichloroethane
Bis(2-ethylhexyl)phthalate
Trichloroethylene
Benzene
Tetrachloroethylene
Toluene
Dichloromethane

Inorganics

Zinc
Lead

Surface Water and Sediment

The Hedblum Industries Site is in a flat area, partially vegetated by trees and brush characteristic of sandy soil. The site has no major drainage features; most of the precipitation infiltrates the sandy soils and is transported to the groundwater system 15-20 feet below ground surface. Discharge of groundwater is to nearby surface waters. The AuSable bayou is the primary discharge point for contaminated groundwater. During the RI, four surface water samples were collected in the AuSable River Bayou, with one upstream and three downstream of the Site. Composite sediment samples were collected at corresponding locations. The risk assessment evaluated the risk to swimmers via dermal contact and incidental ingestion. The chemical-specific risks posed by the chemicals of concern in thee media were below the chemicals of concern in these media were several orders of magnitude below the $1x10^{-6}$ excess lifetime cancer risk level. However, when these same chemicals were evaluated for risks via the fish consumption pathway, the level of risk increased by about two orders of magnitude, exceeding the excess lifetime cancer risk of $1x10^{-6}$. The chemicals of concern presenting the greatest risks were the following:

Organics

Trichloroethylene
trans-1,2-Dichloroethene
Vinyl Chloride
Di-N-Butyl Phthalate

The results showed that TCE appears to be discharging into the bayou. Surface water samples showed TCE, vinyl chloride and trans-1,2-dichloroethylene (DCE) in the low ppb range. Trans-1,2-DCE and vinyl chloride are degradation products of TCE. Acetone, dichloromethane, 2-butanone and toluene were detected in upgradient samples. Since these are common laboratory contaminants, they are not likely to be site-related. Also found was pyrene, a derivative of coal tar, which is used as an anti-fungal agent for wood. Its presence might be explained by the fact that this area was an early lumbering community and the area may have been a wood treatment area.

Soils

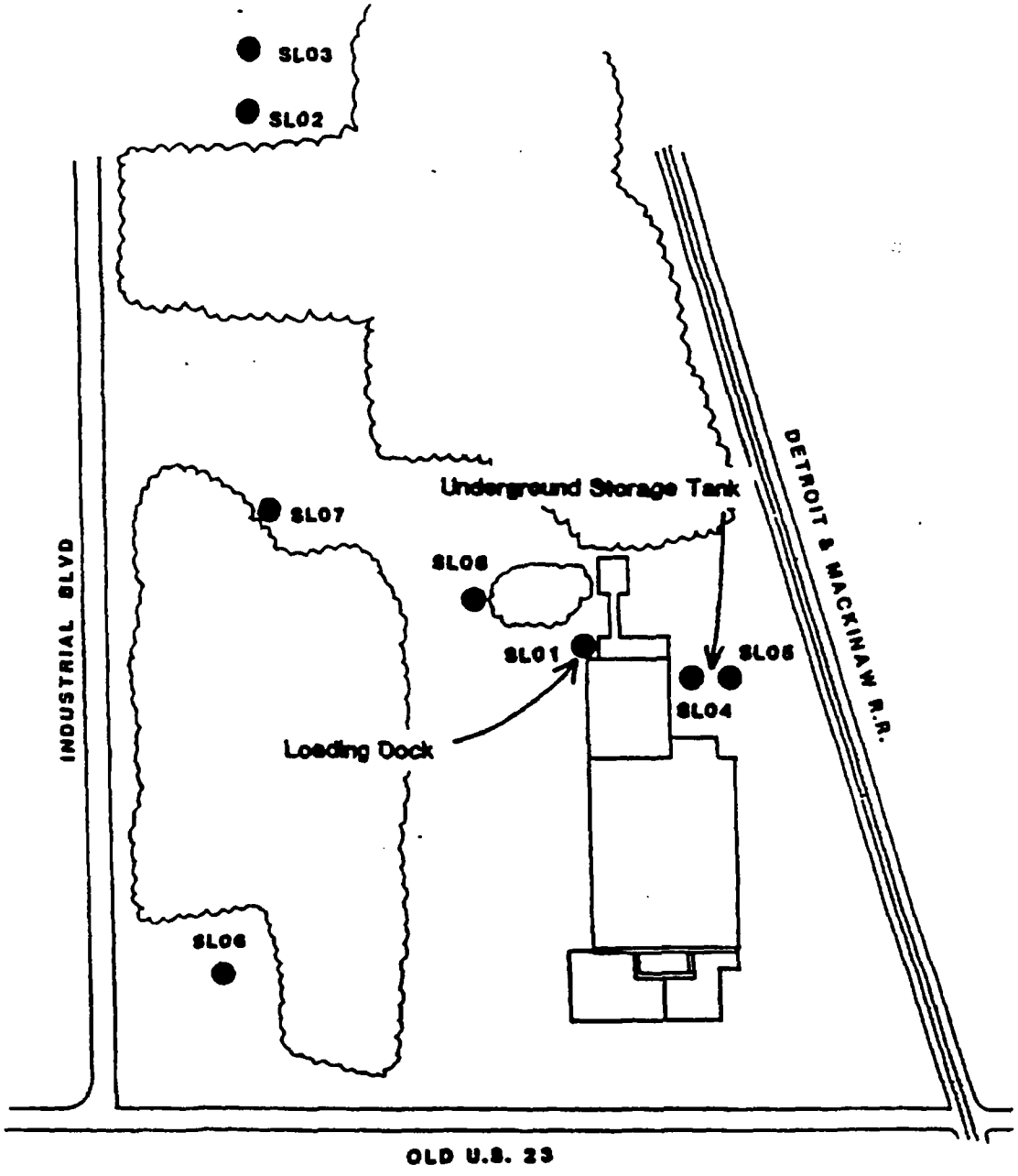
A soil gas survey was conducted by CDM from January 27 to February 5, 1987 as part of the RI. The survey was to locate source areas onsite and to delineate both onsite and offsite contamination. The results showed the highest soil gas concentrations to be in the former loading dock area where wastes were dumped, and the buried tank location on the northeast end of the ATS facility. No TCE soil gas concentrations were found in the Au Sable Heights subdivision (see Appendix 1). In addition, a total of 56 stratified soil samples were taken at eight different locations (see Figure 6) and 38 split-spoon samples were collected during the monitoring well drilling. Since no chemical criteria existed for soils, results were compared to background samples and indicated that no inorganic soil contamination resulted from Site activities. Low levels of TCE , PCE, and TCA were detected near the loading dock and former buried storage tank area. Most split-spoon samples showed either no detection or low levels of VOC contamination. The highest concentrations found were of TCE from MW-8; the highest concentration was 11,000 ppb at a 20-foot depth near the underground tank location

Since the property is not fenced, trespassing is a possible exposure mechanism to surface soils. No surface soils (top 0-2 inches) were collected because it was considered highly unlikely that significant levels of contaminants remained in the surface soils based on the number of years elapsed since the dumping and the fact that site-related contaminants (VOCs) are mobile and expected to move through the highly permeable sandy soil to the groundwater. No analyses were made for deep soil samples (greater than or equal to 15 feet) because of the unlikely direct contact by humans or animals. Current risks associated with exposure of residents to shallow soils via direct contact and incidental ingestion were not evaluated, however, future risks were assessed and found to be relatively insignificant (less than $1x10^{-7}$).

Risk Summary

For the Site areas investigated, the human health risks were driven by potential exposures to halogenated aliphatic hydrocarbons. Under current land use, the primary risks were associated with ingestion of groundwater contaminated with VOCs. Both average and reasonable maximum exposures resulted in upperbound excess lifetime cancer risks exceeding $1x10^{-6}$. In addition, the reasonable maximum exposure scenario for the ingestion of fish from the bayou resulted in an upperbound excess lifetime cancer risk exceeding $1x10^{-6}$. This risk is likely to be overestimated based on conservative assumptions and bioconcentration factors applied in estimating fish tissue

FIGURE 6



HEDBLUM INDUSTRIES SITE

POWER-AUGER SOIL SAMPLES

NORTH

0 100

Approximate Scale, Ft

concentrations. Air exposure and soil exposure pathways did not result in appreciable risk. An environmental assessment was also performed to determine the impacts of the chemical contaminants on aquatic and terrestrial wildlife at the individual and population levels. The aquatic sediments from the Au Sable bayou were found to have acetone and pyrene in excess of levels shown to cause adverse effects under chronic exposure conditions in at least some species. There is no indication that either of these compounds are site-related. No adverse effects are expected to be seen in any of the terrestrial populations found near the Site.

IV. Remedial Actions

Remedy Selection

After a careful evaluation of six cleanup alternatives evaluated during the Feasibility Study (FS), completed in September 1989, the United States Environmental Protection Agency (EPA) explained how the site contamination would be addressed in the September 29, 1989 Record of Decision (ROD) document. The MDNR concurred with the remedial technology selected, however, it did not agree with the TCE cleanup level, the MCL of 5.0 ppb. MDNR supported a cleanup level of 1.0 ppb. The remedial action (RA) goals of the ROD were developed to protect public health and the environment by preventing ingestion and inhalation of the contaminants found in the groundwater, and by restoring the contaminated aquifer. The major components of the selected remedy were as follows:

- Install a three-well extraction well system in the Au Sable Heights subdivision and one extraction well on-site directly downgradient from the plant (see Figure 5)..

- Pump extracted groundwater to the treatment plant for treatment through three granular activated carbon adsorption tanks. This will continue until the chemicals of concern have an additive risk not exceeding $1x10^{-6}$. At a minimum, drinking water MCLs will be met for those applicable chemicals. The discharge from the groundwater treatment system was to meet all legally applicable, relevant and appropriate requirements (ARARs) based on analysis, and would be discharged to the bayou. Spent carbon would be handled as a hazardous waste by a carbon supplier and regenerator.

- Monitor groundwater quality of the aquifer during the treatment process. Affected residents with operating wells will have their wells monitored. If these wells pose a risk to health, they will be supplied with an alternate supply or potable water.

- Abandon six MDNR monitoring wells on the Hedblum property.

- Perform additional subsurface soil monitoring in both the saturated and unsaturated zones to further define the magnitude and extent of soil contamination and to determine the need for soil remediation.

- Perform a pre-design study to obtain information in accordance with the SOW which included:
    - Additional groundwater sampling from all monitoring and residential wells; and,
    - Additional plume definition to determine the Total Organic Carbon (TOC) content of soils and assess contaminant retardation in groundwater; perform leach testing on site soils to determine the retardation factor; and complete additional slug tests or an aquifer pump test on uncontaminated upgradient wells to determine aquifer characteristics.

The selected remedy did not include an institutional controls component.

Remedy Implementation

On January 4, 1990, EPA issued a Unilateral Administrative Order (UAO) directing the potentially responsible party (PRP), Amtel, Inc., to perform Remedial Design/Remedial Action (RD/RA) work for the selected remedy. This work was to conform with the requirements of the Statement of Work for RD/RA, incorporated as Appendix I to the UAO. Amtel, Inc. notified EPA of its intent to comply with the UAO on March 22, 1990. Its contractor, McLaren/Hart Engineers Midwest, Inc. of Southfield, Michigan submitted a preliminary design to EPA in January 29, 1992 for a groundwater treatment system. EPA approved the RD in September 22, 1992. The construction of the groundwater cleanup treatment system began on December 16, 1992. The RA field activities were completed and a pre-final inspection was conducted on July 20, 1993. On August 16, 1993, the preliminary close-out report was issued signifying that construction was completed. Also, a state support cooperative agreement grant was awarded to MDEQ to fund operation and maintenance (O&M) oversight of the groundwater extraction and treatment system. Since the last five-year review in 1999, approximately 6.8 billion gallons of contaminated groundwater have been treated. To date, approximately 7.0 billion gallons of contaminated groundwater have been treated and discharged to the bayou, indicating that the majority (98 %) of contaminated water treated since 1993 has occurred over the last five years.

On June 12, 1992, the requisite additional soil sampling was conducted in both the saturated and unsaturated zones to further define the extent of soil contamination and to determine whether there was a need for remediation. A total of four borings, each boring consisting of two soil samples, were completed in the vicinity of the ATS facility. Two were completed adjacent to the loading dock near the northwest corner of the plant and two were adjacent to the former under-ground storage tank (UST) near the northeast corner of the plant. The analysis of the samples showed PCE ranging from 3 to 29 ppb, TCE ranging from 4 to18 ppb, and 1,1,1,-TCA from less than 10 to16 ppb. The samples with detectable VOCs were obtained from just above the water table and probably represent the effect of seasonal fluctuations in the impacted groundwater table on the soils in the capillary fringe zone. Partitioning of the dissolved VOCs from groundwater to the vapor phase was thought to account for the low levels found in the samples. At this time, it

was determined that there was no need for soil cleanup in this area.

All construction at the site is complete, and the groundwater treatment is ongoing. While treatment is taking place, the EPA has determined that the Hedblum Industries Site poses no immediate danger to the surrounding communities; however, the EPA and the MDEQ are currently working with Amtel, Inc.[1] to ensure that it remains in compliance with the UAO.

System Operations/O&M

The system extracts groundwater, removes VOCs through an aqueous phase carbon adsorption process, and discharges the treated water to the bayou. Liquid phase carbon adsorption involves passing the influent water through a bed of granular activated carbon (GAC) to remove organic chemicals. The chemicals present in the influent supply are adsorbed onto the activated carbon until the carbon becomes saturated. When saturation levels are reached in the carbon bed, the adsorption processes stop, and the water that comes into contact with the GAC is no longer treated until the spent carbon is replaced with new or regenerated carbon. Achievement of the required empty bed contact time ensures that concentrations of TCE and 1,1,1-TCA are reduced to less than 5 ug/l (ppb). Metals concentrations are not be reduced by the GAC treatment system. However, levels of aluminum, barium, iron, lead, and zinc are below the surface water discharge limits proposed by the MDNR. Treated water is discharged to the bayou, at a maximum rate of approximately 90 gallons per minute (gpm).

The system is housed in a secure aluminum shed and consists of three 3,000-pound pressurized GAC beds operating in series with the associated piping and mechanical and electrical controls. The treatment system is designed for automatic operation. A system monitoring panel is located in the treatment building, adjacent to the ATS building. The panel includes alarm status indicators (annunciator), process indicators, and a process strip chart. Automated control functions have been provided for pump systems, including the extraction well pumps and effluent pumps. Additionally, the extraction well pumps are equipped with automatic shutdown in the event of carbon system high differential pressure or high sump water level. In the event of system shut down for any reason, the auto telephone dialer is triggered to call the operator's cell phone and office until it is answered.

Weekly site visits by Amtel's O&M contractor Global Environmental Engineering, Inc. (Global) in Elk Rapids, Michigan include assessment of system operation, and general inspection of the site and system conditions. System maintenance involves:

- Carbon change out as needed;
- Repair/clean out of extraction wells and flow lines, as required;

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[1] Amtel, Inc. was acquired by United Dominion which subsequently was acquired by SPX Corporation.

• Trouble shooting treatment system problems, as required; and,
• Responding to system auto telephone dialer situations.

The weekly maintenance log sheet used by Global is found in Attachment 1. Maintenance of the system will be for the full operating life. The projected operating life of the system during RD was five years, however, due to reduced system operating rates in the past, it is now anticipated to be much longer. It was also anticipated that the system would require little maintenance other than carbon changeout as determined by actual flow rates and influent chemical concentrations, however this has not been the case. Some of the larger O&M operations have involved pulling and replacing extraction well pumps to obtain a greater total system extraction capacity and replacing extraction well system plumbing. Some of the other necessary O&M activities over the past five years have included:

Date	Activity
06/28/99	New Transmitter (MCP)
08/24/99	New Transmitter and Receiver in both EW-1 and EW-4
09/25/00	Carbon Change-Out
04/24/01	New Photohelic Gauge
05/01/01	New Relay (240 V) and base in EW-4 and New Relays (120V and 240V) in EW-1
07/10/01	New Relay (120V) and base in EW-3
04/24/02	Carbon Change-Out
05/16/02	New Photohelic Gauge
10/10/02	New Relay (120V) in EW-1
12/13/02	New Well Starter Box in EW-2
07/02/03	New Transmitter in EW-2
10/23/03	Flow line Cleanout
10/29/03	New Plumbing in all Extraction Well Vaults (No flow meters included due to constant fouling)
11/14/03	New Pump, Wiring and Drop-pipe in EW-3
04/21/04	Carbon Change-Out
04/29/04	Reconditioned Photohelic Gauge
07/07/04	New Well Starter Box in EW-2

The UAO defines specific data collection activities that are designed to document the achievement of the performance criteria, and to enable evaluation of the operation and effectiveness of the remedial system. Specific sample collection and monitoring procedures, and chemical analytical parameters are defined the RD/RA Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP). The sampling is performed by Global. Samples are sent to the analytical contractor, Trace Analytical Laboratories, Inc. of Muskegon, Michigan. The extraction and monitoring well system monitoring includes:

1) Groundwater chemical quality data: during the operational life of the system, influent, stand,

and effluent sampling are conducted as necessary to ensure proper functioning of the system, to monitor carbon usage and to monitor changing groundwater conditions at the Site. System monitoring involves sampling and analysis of:

- Influent, stand, effluent of the carbon adsorption system (see Table 2)
- Groundwater from extraction wells EW-1 through EW-4 (see Table 3)
- Groundwater from selected monitoring wells. Since September 1999, the well sampling pattern found in Table 4 below has been used.

2) Groundwater level data;
3) Extraction well pumpage data; and
4) Discharge rate and chemical quality of extracted fluids discharged to the bayou.

TABLE 2 - MONITORING AND REPORTING REQUIREMENTS

ACTIVITY	Parameter	FREQUENCY
ENVIRONMENTAL MONITORING PROGRAM		
Influent Monitoring	TCE, 1,1,1-TCA	Monthly
Treatment Stage Monitoring		
After first GAC Tank	TCE, 1,1,1-TCA	Monthly
After second GAC Tank	TCE, 1,1,1-TCA	Monthly
Effluent Monitoring		
Flow	MGD	Daily
Purgeable Halocarbons	Method 8260	Monthly
Purgeable Aromatics	Method 8260	Monthly
pH		Monthly
Outfall Observation	Visual	Weekly
Equipment Inspection	Visual	Weekly

TABLE 3 - GROUNDWATER CHEMICAL MONITORING SCHEDULE

Network Location	Time Period	Sampling Frequency	Analytes
Monitoring Wells			
MW-10, MW-11 MH-4S, MH-4D MW-3, MW-8, MW-9[3], MW-12, MW-13[4]	Year 1-2 Year 3-Closure	Quarterly[1] Semi-annually[2]	VOCs VOCs
MW-1S, 1D, 2S, 3S, 3D, 3, 4S, 4D, 8, 9, 10, 11, 12, 13	Year 1-Closure	Quarterly	Water Level Data
Extraction Wells			
EW-1, EW-2, EW-3, EW-4	Year 1-2 Year 3-Closure	Quarterly[1] Semi-annually[2]	VOCs VOCs
All Wells	Post-Closure[5]	Four semi-annual	Chemicals of Concern

Notes:

1 - Samples will be collected quarterly for the first two years after approval of 100% RD document package.

2 - Samples will be collected semi-annually after the first two years of sampling, if for any three consecutive quarters, Amtel demonstrates that the monitored levels of TCE and full scan VOCs are decreasing or stabilized. Sampling will cease when EPA approves Amtel's Certification of Completion.

3 - Same location as extraction well EW-3.

4 - Same location as extraction well EW-4.

5 - The Certification of Completion shall demonstrate that target clean-up levels have been attained for all Chemicals of Concern identified in the Record of Decision.

TABLE 4 - MONITORING WELL SAMPLING ROTATION SCHEDULE

March 1999	June 1999	Sept. 1999	Dec. 1999	March 2000	June 2000	Sept. 2000	Dec. 2000	March 2001	June 2001	Sept. 2001
EW-1	EW-1	EW-1		EW-1		EW-1		EW-1		EW-1
EW-2	EW-2	EW-2	EW-2	EW-2	EW-2	EW-2	EW-2	EW-2	EW-2	EW-2
EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	
EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4
MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3
MW-4D	MW-4D	MW-4D	MW-4D			MW-4D				MW-4D
MW-4S	MW-4S	MW-4S				MW-4S				MW-4S
MW-8	MW-8	MW-8				MW-8				MW-8
MW-9	MW-9	MW-9				MW-9				MW-9
MW-10	MW-10	MW-10				MW-10				MW-10
MW-11	MW-11	MW-11		MW-11		MW-11		MW-11		MW-11
MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12
MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13

Dec. 2001	March 2002	June 2002	Sept. 2002	Dec. 2002	March 2003	June 2003	Sept. 2003	Dec. 2003	March 2004	June 2004
	EW-1		EW-1		EW-1		EW-1			
EW-2	EW-2	EW-2						EW-2	EW-2	EW-2
EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3	EW-3
EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4	EW-4
MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3
			MW-4D				MW-4D			
			MW-4S				MW-4S			
			MW-8				MW-8			
			MW-9				MW-9			
			MW-10				MW-10			
	MW-11		MW-11		MW-11		MW-11			
MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12
MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13

The substantive requirements of an National Pollution Discharge Elimination System (NPDES) permit was necessary for the Hedblum Industries Site treatment system in order to discharge treated groundwater to the adjacent bayou. The discharge of groundwater is covered by the MDEQ Surface Water Quality Division (SWQD) Substantive Requirements Document (SRD). In May 1993, the MDNR issued an SRD to Amtel (SRD # MIU990001) and modified in April 1996.

Site closure shall be determined based on RA chemical monitoring data for the following list of Chemicals of Concern:

Organics		**Inorganics**
Acetone	Methylene Chloride	Aluminum
Benzene	Tetrachloroethylene	Barium
Bis (2-ethylhexyl) phthalate	1,1,1-Trichloroethane	Iron
Carbon tetrachloride	Trichloroethylene	Lead
Chloroform	Toluene	Mercury
1,1 -Dichloroethane	Vinyl Chloride	Zinc
1,1 -Dichloroethene	Xylenes (total)	
(trans) 1,2-Dichloroethene	Di-n-butyl phthalate	

Closure criteria will be attained for the above listed chemical compounds before final Site closure is granted. Closure will be based on:

(1) Final MCLs (Safe Drinking Water Act Standards); and
(2) State of Michigan Type B criteria, estimated for groundwater. These criteria have been replaced as of December 21, 2002 by the Administrative Rules for Part 201 (Generic Cleanup Criteria and Screening Levels for Groundwater), Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

As per the Final Remedial Design Report (August 13, 1992), if background concentrations of any chemicals listed above exceed the closure criteria, the final closure cleanup level shall be background. Chemical monitoring data used for any RA Certification of Completion or incremental RA reduction petition shall be based on analytical results for VOC chemicals listed above. If analytical data shows an asymptotic concentration decrease over three consecutive quarters, then Amtel will reduce the frequency of monitoring from quarterly to semiannually. Monitoring shall continue until EPA approves the Certification of Completion. The Certification of Completion of Groundwater Remediation Activities shall demonstrate that target clean-up levels have been achieved for all Chemicals of Concern identified in the ROD, over two years of semiannual monitoring. If the results of two consecutive semiannual monitoring events show that the concentrations of TCE are increasing, then quarterly groundwater monitoring will be instituted.

Operation Costs

Cost figures were not able to be obtained from the RP. The originally estimated annualized operating costs for running a system of 60-90 GPM is provided in Table 5. The RP anticipates installing a new wireless telemetry system which uses radio frequencies and telephone lines to alert the operator when the system is down. This will require an initial expenditure to upgrade the system. Operational costs may subsequently decrease overall.

TABLE 5 - SYSTEM OPERATIONS/O&M COSTS

Carbon Replacement	$43, 866.00
Heating	$1,800.00
Labor	$11,440.00
Supervision	$1,144.00
Overhead	$8,580.00
Laboratory Services	$50,000.00
Insurance and Taxes	$7,409.00
Power Requirements	$8,500.00
Total	$132,739.00

V. Progress Since the Last Review

The protectiveness statement from the first Five-Year Review (September 1999) stated that the groundwater contaminant levels have not yet achieved MCLs; but the data show a generalized decline in concentrations during the period of time the extraction wells have been operating. The report stated that the remedy for the Site was protective of human health based on the groundwater monitoring data, effluent discharge reports, the site visit observations and the assumption that the residents of the Au Sable Heights subdivision were not being exposed to the groundwater. The review also determined that the remedy was not handled in a manner that could produce the maximum environmental benefits. The initially projected time period required for groundwater to meet MCLs at the site was five years, however due to a reduced extraction rate and treatment capacity, additional time will be required before the Site can be considered cleaned.

Correspondence since December 1993 indicate that the treatment system has historically experienced a reduced flow rate problem. According to previous EPA project managers for the Site, the treatment system initially operated at the design flow rate of about 90 gpm for a short time. The rate was quickly reduced due to fouling of the filters by iron bacteria; however, there

has been no agency approval of reduced flow on a long-term basis. The iron filters are now bypassed to eliminate the clogging problem. Flow lines still get blocked by the iron bacteria buildup and must be cleaned with high pressure air. Attachment 2 provides a listing of flow rates over the last five years. The review also stated that because the most recent toxicity tests performed indicated some chronic toxicity to the test organism, the remedy as operated, may not be fully protective of the environment.

As of the last five year review, several issues pertaining to the SRD had not been resolved. The following is a summary of the issues and how they were addressed.

Amtel was required to submit three months of grab samples from a representative upgradient well and three months of 24-hour composite effluent samples in order to evaluate whether a reduction in frequency or termination of metals monitoring is appropriate. Amtel had previously supplied four upgradient samples (March 1997, September 1997, October 1999, March 2000) but only one of the three required 24-hour composite rounds of metals (March 2000). Subsequent to EPA's finding that Amtel was in violation of the UAO, Amtel submitted three 24-hour composite effluent samples for metals (April 2000, May 2000, June 2000). The effluent tests indicated that four of the five metal parameters (cadmium, copper, lead and mercury) were within the discharge limits, however, zinc consistently exceeded its discharge limit by a factor of 3 to 5 times. Amtel failed to report the exceedance to the MDEQ- SWQD and immediately cease effluent discharge. The results of these tests indicate a relatively high level of zinc in the upgradient well samples; hence, the high level of zinc in the effluent is not likely to be Site-related, but is more likely due to well construction. The effluent zinc levels do not appear to be stressing the organisms in the receiving waters as evidenced by the toxicity test results. However, since the zinc level still exceeds its discharge limit, continued metals monitoring, albeit on a less frequent basis, may be necessary.

Amtel was also required to conduct and submit three months of 24-hour composite whole effluent toxicity (WET) test results to the Agencies at which time a request for reduction in monitoring frequency may be submitted for consideration. A previous MDEQ grab sample (September 1997) showed an exceedance of the SRD discharge limit for chronic toxicity. The Agencies subsequently received only one 24-hour composite acute and chronic toxicity test result from Amtel (January 1998) indicating exceedance of the same parameter. As in the case of zinc, because Amtel failed to report the exceedance to the MDEQ- SWQD and immediately cease effluent discharge. To resume discharge, Amtel needed to demonstrate that it could consistently meet the discharge limits of the SRD by submitting 24-hour composite WET acute and chronic toxicity tests for three consecutive months. The requisite toxicity testing reports from Amtel (April 2000, May 2000 and June 2000) were subsequently performed. The results did not indicate any violation of the SRD limits for either acute or chronic assays on both test organisms (fathead minnow and *ceriodaphnia dubia*), however, the average monthly discharge rates during these sampling periods were 24, 28, and 42 gpm respectively. Since these rates were below design capacity during sampling, the toxicity results may not be representative of higher flow conditions. There is no reason to continue this testing on a regular basis due to the apparent lack of impact from the zinc levels, and the fact that the volatile organic chemicals (VOCs) of concern

in the groundwater are expected to show a decreasing trend following pump replacement and well rehabilitation. A composite sample under representative conditions of higher flow may be recommended to ensure that the criteria are being met.

Amtel is also required to submit information on equipment inspection, the outfall observation, and monthly pH analysis. The equipment and outfall inspections are performed weekly, however the inspection log information (see Attachment 1) is not submitted to the agencies. The pH analysis is submitted in the monthly report. The MDEQ insists that the requirements of the SRD document continue in force to ensure that the contaminants of concern discharging to the bayou area are below the SRD-established concentration criteria until: 1) Amtel (SPX Corp.) has submitted a formal request for a waiver of this ARAR; and, 2) the request has been approved by the MDEQ-SWQD. Amtel, Inc. previously submitted such a request in March 2000, prior to having undertaken the metals and toxicity testing of April, May, and June of 2000. Therefore, an updated request for ARARs waiver will be reviewed by MDEQ; discontinued or reduced effluent monitoring, such as an annual composite metals test and/or an updated toxicity test under representative flow conditions may be needed. The issues that were identified during the first five year review are presented in Table 6.

TABLE 6 - ACTIONS TAKEN SINCE LAST FIVE-YEAR REVIEW

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Mileston e Date	Action Taken and Outcome	Date of Action
The groundwater extraction rate is about 40-50 % of the approved design rate, extending the operation of the pump and treat system beyond the five year estimate.	Develop sound O&M procedures to clean extraction wells, screens, etc. to increase flow rates at each well and throughout the treatment unit. Implement more efficient physical/ chemical processes to remove iron, which continues to foul and plug the first carbon tank.	RP	ASAP	EW-1, EW-2, and EW-4 well pumps were pulled and replaced. New plumbing in extraction well vaults A new pump, wiring and drop-pipe in EW-3 Flow line cleanout via air sparging	2001 10/29/03 11/14/03 10/23/03
RP has only completed one of the three monthly required metals tests for the treated effluent discharged to the bayou (performed 9/29/95) as per the NPDES substantive permit requirements detailed in the 1996 SRD.	Collect two remaining monthly samples for metals	RP	ASAP	The 3rd and 4th upgradient metal samples collected; four monthly composite samples submitted to EPA and MDEQ. No further testing is required.	3/2000, 4/2000, 5/2000 and 6/2000

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
RP has not completed the required three monthly toxicity tests on the influent and treated effluent discharge as per the SRD. MDEQ conducted a grab toxicity test (Sept. 1997) showing chronic toxicity to *ceriodaphnia dubia*. The RP repeated test January 1998 with same result	Conduct whole effluent toxicity tests for the required three months.	RP,	ASAP	RP conducted the required acute and chronic toxicity tests and submitted results to EPA and MDEQ. Results showed no exceedance of toxicity limits.	4/2000, 5/2000, and 6/2000
Improved reporting methods are necessary	Submit specific log-book information on weekly equipment inspection, maintenance procedures and outfall observations.	RP	ASAP	No Action	N/A
Elevated levels of TCE in samples caused the lab to dilute the TCE samples, thereby increasing the detection limits for some other compounds above the clean up criteria	Reduce the method detection limit to equal or less than the cleanup criteria for all monitored parameters.	RP	Prior to 9/2004	No Action	N/A
Existing monitoring and piezometer wells need to be used effectively to monitor the capture and remediation of the groundwater plume. It is difficult to produce a piezometric surface map of plume capture; hence, the current configuration of the plume has not been recently mapped.	More water quality and water level data are needed from different locations to assess the plume capture. At a minimum, existing MWs #14, 15, 5S and 5D will need to be included in the quarterly monitoring program.	RP	ASAP	No Action	N/A

VI. Five-Year Review Process

Administrative Components

Members of the MDEQ, Amtel, Inc., the Townships of Au Sable and Oscoda were notified of the initiation of the second five-year review in June 2004 via a notice that was placed in the local paper. The Hedblum Industries five-year review team was led by the EPA Superfund Remedial Project Manager (RPM) Sheila Sullivan and includes EPA's Community Information Coordinator (CIC) Robert Paulson and EPA Site attorney Richard Clarizio. MDEQ members

include Superfund Project Manager Cindy Fairbanks, Geologist Matthew Baltusis, and Unit Chief Robert Reisner. Representatives for the RP, now SPX Corporation, include attorney Thomas Hoban, Global Project Manager Andrew Girard, and Global President William Korreck. Beginning in April 2004, the RPM established the components of the Review, which included:

- Community Notification
- Document Review
- Data Review
- Site Inspection/Community Interviews
- Five-Year Review Report Development and Review

Community Notification and Involvement

Activities to involve the community in the five-year review process were initiated in April 2004 in the form of a notification to the Region 5 Superfund CIC for the Hedblum Industries Site. A notice announcing the initiation of the five-year review process and soliciting Site information and concerns from the community was published on June 28, 2004 in the Oscoda Press, a weekly newspaper serving northern Iosco and southern Alcona counties (Attachment 3).

Community interest regarding environmental issues has been moderate due to the residential well sampling in the Au Sable Heights subdivision conducted over the years, and the close proximity of Wurtsmith AFB, which has been under remediation due to a solvent plume in the groundwater. The Hedblum Industries Site had not generated much public interest prior to the RI/FS work. Past community relations activities for the Site have included public meetings held at the start and completion of the RI/FS process to present the RI results and the Proposed Plan for the Site cleanup. Fact sheets were routinely distributed to update the community of the cleanup progress. EPA has also maintained two document repositories (Au Sable Township Hall and the Oscoda Public Library, now the Robert Parks Library) in the community throughout the cleanup process.

The most recent community relations activities involved concern from a resident in the Au Sable Heights subdivision regarding the status of the groundwater plume beneath the subdivision and the possibility of solvent exposures from soil vapor intrusion through the basements and crawl spaces. Since the June 28, 2004 notice was published, however, few community members have expressed interest or concern regarding the five-year review process. It is worth noting that Au Sable Township, with the aid of a consultant, updated its 1982 Community Master Plan, holding two community input sessions in the spring of 2003. There is much community interest in redefining the community as a historically significant community with a vital economy based on recreational/tourism and light manufacturing-based businesses.

Document Review

The five-year review included a review of the relevant documents which included the RI/FS, RD/RA, SOWs, ROD, all enforcement documents, and groundwater cleanup standards and risk-based levels to protect human health and the environment. Also post-RA documents such as the PCOR, first five-year review, and applicable EPA and MDEQ guidance. The comprehensive list of documents is included as Attachment 4.

Data Review

All data since the previous September 1999 five year review were evaluated to discern relevant trends and the closeness to achieving cleanup criteria for the contaminants of concern. The data reviewed included groundwater, surface water and soil.

Groundwater/Monitoring Well Network

Groundwater monitoring results show that the groundwater contaminant plume has not yet achieved MCLs; but, based on the data in Attachment 5, it appears that a general decline in concentrations has occurred during the period of time the extraction and treatment system have been in operation. As approved by the agencies, the extraction well system was designed to effectively capture the contaminant plume and reduce the contaminant concentrations in the groundwater to levels at or below the MCLs within an estimated five years. The monitoring well network, as approved, was to monitor the effectiveness of the plume capture and remediation during the operation of the groundwater system. However, the operation of both the extraction well and monitoring well systems have not always functioned at the capacity or extent detailed in the design or O&M documents due to operational problems, thus extending the time period of running the pump and treat system. Since the last five year review of September 1999, this problem has been resolved to some extent by replacing the pumps with higher capacity pumps and replacing the flow lines and plumbing. It was also noted in 1999 that not all of the monitoring wells were sampled each month, thereby forgoing the opportunity to collect valuable groundwater head and water quality information needed to assess the effectiveness of the system. While there were no strong or discernable trends, the following contaminant observations were made since the last review using the data supplied by Global (see Figure 5 and Attachment 5).

At the source area in MW-3, TCE and PCE generally decreased during 1999 and remained at about 8.0 and 1.1 ppb respectively. In April 2001, TCE spiked to 86 ppb. Since then, TCE and PCE gradually increased to 420 and 37 ppb respectively in 2004. In MW-8, the TCE concentration declined to trace levels through April 2001, but began increasing in September 2002 to the present level of 40 ppb. In MW-9, TCE remained at nondetectable levels during this time frame. EW-3 (also positioned at the source area) exhibits sporadic fluctuations in TCE over time from below 50 ppb to about 400 ppb in April 2001. The VOC spikes over the last years seem to occur during the month of December when the concentration reached 1,100 ppb in December 1998 and then decreased to 28 ppb. In December 2000, another spike to 390 ppb occurred. The next increase occurred in December 2001 when TCE reached 290 ppb. In

December 2003, the TCE level hit 150 ppb and is presently stable at this level. The PCE levels also showed similar fluctuations but at much lower levels and has not exceeded the MCL since December 2000 when it was 6.9 ppb.

Downgradient from the source area and at the northern edge of the plume, MW-11 has shown a stable nondetectable TCE level since December 1997. TCE was last detected below the MCL in MW-10 in March 1999. PCE and TCA were also found below their respective MCLs. Downgradient and in the center line of the plume, MW-12, exhibited an increasing TCE trend since 1999 when it spiked to 2,100 ppb in March 2000. Since then, it has sporadically decreased to levels ranging between 25 and 1,500 ppb. This pattern may represent slugs of pure TCE moving downgradient. MW-13 exhibits some moderate spikes of 1,1,1-TCA, ranging from 79 to 310 ppb, since 1999. In September 2001, the levels decreased to 12 ppb, but began to rise in January 2004 to about 60 ppb. TCE levels in MW-13 followed a similar pattern but at relatively lower concentrations. TCE appear to have fluctuated between 60 and 170 ppb since 1999, but also began rising in January 2004 to about 60 ppb. PCE appears to display the same pattern; however, the magnitude of concentrations are lower, ranging from about 7 to 19 ppb. An increasing trend is currently apparent. In EW-4, the TCE contamination levels increased top 160 ppb in December 2000, then dropped to 1.5 in September 2002. The TCE level has steadily increased to 91 ppb in December 2003. TCA also follows this trend but at lower concentrations not exceeding 13 ppb. The data from this middle group of wells along River Street preliminarily suggests that the plume may be more south and east of the current well system, since TCE levels increased in the southeasterly wells.

At EW-2 (the farthest downgradient well), near the bayou, the TCE concentrations have declined from 16 ppb in 1999 to nondetect in 2002. The trend increased since then to about 15 ppb in 2004 when EW-2 came back online after repairs. (See Attachment 5 for groundwater contaminant concentrations).

A preliminary analysis of the hydraulic data supplied over the past five years was performed to determine the plume capture zone efficiency. The application of a conventional model to the data produced no evidence of a capture zone as predicted by the QUICKFLOW model in the design documents. This may be due to the fact that the wells used for these measurements are not in the correct locations to detect a capture zone. Further, not all of the available wells are used to provide these data, for example, there is no hydraulic data provided from the discharge area, i.e., MWs 5S, 5D, 14 and 15. Therefore, there are not enough monitoring wells or piezometers, and the existing wells are not in the correct locations to assess the capture zone efficiency.

If the necessary capture zone has not been established, then rises and or fluctuations in contaminant levels can occur due to previously mentioned factors, such as the presence of clay lenses in the aquifer containing which adsorb the VOCs and act as a physical barrier to VOC solute migration. VOCs could form highly concentrated small pools in localized clay lense depressions and slowly re-dissolve into the groundwater or could be flushed by the clay barrier.

Another possibility is that the VOCs at the leading edge of the plume may have diffused out of active pore spaces into dead or inactive pore spaces in the aquifer. Solutes in the dead pore spaces, estimated to comprise one-third to one-fourth of the total pore spaces of the aquifer, are essentially trapped and would not move with the groundwater. As the contaminant plume moves through the aquifer, the trapped solutes slowly move back into the active pore spaces along a concentration gradient and become evident in groundwater.

According to the concentrations seen in the sampling, operation of the system will be necessary for some time into the future. Further, the current operations and maintenance, including all monitoring will need to be continued at least at the current level.

Surface Water

As mentioned in Section V, Amtel performed the required metals monitoring and 24-hour composite whole effluent toxicity tests identified in the SRD for the discharge of treated effluent into the bayou receiving water. The results of these tests indicate a relatively high level of zinc in the upgradient well samples; hence, the high level of zinc in the effluent is not likely to be Site-related. The effluent zinc levels exceed the discharge limit but do not appear to be stressing the organisms in the receiving waters as evidenced by the toxicity test results.

Groundwater Treatment System

Correspondence from December 1993 indicates that the treatment system has historically experienced a reduced flow rate problem. According to previous EPA project managers for the Site, the treatment system initially operated at the design flow rate for a short time. The rate was quickly reduced due to fouling of the filters by iron bacteria. During 1999, the total flow rate has decreased significantly from the design rate of 90 gpm. During May 1999, the daily maximum flow rate was 27.5 gpm and the monthly average was 25.0 gpm. In June 1999, the daily maximum dropped to 21.9 gpm and the monthly average dropped to 9.4 gpm. In 2000, the monthly average flow increased and was generally higher, reaching about 53 gpm in July. After July 2001, however, the flow rate showed a decreasing trend, and dropped to about 6 gpm in April 2001. The remainder of the year hovered around 20-30 gpm. The downward trend continued in 2002, with the lowest months being October (3.8 gpm) and November (1.4 gpm). In December 2002 (35.2 gpm) and continuing into February 2003 (42 gpm) a temporary increase in flow rates occurred and then trended downward to October (8.2 gpm). The low flow rates can be attributed to the fact that EW-2 was not operating from August 2002 through October 2003 due to electrical problems. The transmitters and receivers had to be reprogrammed due to a code switch. November 2003 showed a rise (74.9 gpm) to about 105 gpm in December 2003. This was due to the flow line cleanout in October 2003, EW-2 being put back in service, and the installation of the new pump in EW-3. The flow rate remained above 100 gpm through May 2004 when it peaked at 112 gpm, then dropped by more than half (40.6 gpm) in June 2004. The monthly discharge flow reports have been summarized in Attachment 6. It is necessary to provide information to the agencies on: 1) how the pumping rate will be maintained at this level, and 2) the individual extraction rates for each well.

In addition, a review of the monitoring data indicates that on several occasions the laboratory, due to the elevated levels of TCE, and 1,1,1-TCA, diluted the samples. However, in the process, the respective detection limits were increased to values exceeding the cleanup criteria for some of the other compounds. This practice was observed during the following dates at select well locations (please refer to the table below). It was also noted that for samples collected in June 2001, a different analytical facility, Asci Corporation Environmental Quality Laboratory of Port Charlotte, Florida, was used instead of Trace Analytical Laboratories.

TABLE 7 - INSTANCES OF SAMPLE DILUTION DUE TO HIGH TCE LEVELS

REPORTING DATE	WELLS
December 2003	MW-3, EW-3
September 2003	MW-12
July 2003	MW-12
December 2002	MW-12
October 2002	MW-12
June 2002	MW-12
March 2002	MW-12
December 2001	MW-12, EW-3
October 2001	MW-12, MW-13 (TCA)
January 2001	MW-13 (TCA), EW-3
September 2000	MW-12, EW-3
June 2000	MW-12, EW-3
April 2000	MW-12
January 2000	MW-12
October 1999	MW-12
July 1999	MW-12
March 1999	MW-12, EW-3

The present monitoring well and piezometer well networks, while sufficient to determine whether the plume is being captured and remediated, are not being operated as effectively as possible to remediate the plume within the original projected time frame of five years.

Site Inspection

The Hedblum Industries five-year review inspection was held on July 21-22, 2004. The review team was led by the EPA Site RPM Sheila Sullivan. MDEQ staff included Project Manager Cindy Fairbanks, Geologist Matthew Baltusis, and Superfund Unit Chief Robert Reisner. Other members included SPX Corporation legal representative Thomas Hoban, SPX Corporation Environmental Health and Safety Director Daniel McGrade, Global Project Manager Andrew Girard, and Global President William Korreck. The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of the Site itself, i.e., extraction and monitoring wells, treatment system, the surrounding land and institutional controls, if applicable. During the inspection, the representatives discussed Site and community issues. The completed inspection checklist is provided as Attachment 7.

The weather conditions on July 21st were sunny and warm; the air temperature was about 80°F and slightly humid. The Site inspection began at the north end of the ATS facility, where the solvents were originally dumped. The parties inspected the soil and locations where the buried tank had been removed. A discussion regarding the utility of further soil sampling ensued. The soil is a loamy sand, easily conducting the dense solvents to the lower clay layer. The soil supports light vegetation and grasses. The treatment building housing the GAC units is also located in this area. The small building and three GAC treatment units, piping and control panels were inspected and found to be in good condition. The representatives walked around the Site area. The immediate 10-acre Site area, on which the 21,000 square foot ATS facility sits is not fenced and there are no signs posted. The ATS facility has a security system and employs 22 workers over one shift. The GAC treatment building is always locked. It is believed that fencing would not be effective in keeping trespassers out, and there are no on-Site contaminants present from past and current activities that would present hazards.

The extraction wells (EWs 1, 2, 3, and 4) and monitoring wells (MWs 1S, 1D, 2S, 18, 3S, 3D, 4S, 4D, 5S, 5D, 8, 9, 10, 11, 12, 13, 14, and 15) were also checked during the inspection and were found to be in good condition and locked. Several of the wells are situated on private property. For example, MWs 10 and 11 are fenced within a back yard dog run. No signs of vandalism or tampering were evident. MWs 14 and 15, which have shown no contamination over many sampling rounds, are no longer sampled. MW 5S and 5D are not sampled either as no VOCs have been detected. MWs 16 and 17, supposedly located off Sixth Street, are never used as they are not readily visible and may no longer exist. The discharge point outfall was also checked and found to be in good condition.

There are no institutional controls at the Site, as it was not deemed necessary at the time of the ROD to restrict access to and use of the Site and the surrounding property for any purposes. The property zoning on which the ATS facility and GAC treatment plant are situated is restricted to industrial use. There are no other planned uses for the property in the future other than the present use. There are no controls prohibiting the use of groundwater beneath the Site; however, private groundwater wells are not used at the facility. The HSRWU water supply is the source of

all potable water to the area, however the inspection team questioned whether residents in the Au Sable subdivision northeast of the Site use private wells for drinking or other uses. Information from Au Sable Township indicated that five residences were not connected to the HSRWU supply, as discussed in the next section. There are no local ordinances precluding the use of groundwater in the area. After the plume characteristics are determined and the samples from the five residences are evaluated, the agencies will review the need for institutional controls. Such review will include information on the local land use restrictions on the use of contaminated ground water. Figure 5 provides a map of the existing water supply infrastructure.

The Au Sable Bayou area, the headwaters of the Au Sable River, is lushly vegetated with an abundance of wildlife. Canoers were seen in this area. The terrestrial and riparian foliage was dense and healthy, capable of supporting numerous animal, bird and insect species.

The RPM also visited the Oscoda and Au Sable Township offices where maps of the Township property were reviewed and obtained. An interview was also held with the City Clerk's office and Water department. Finally, a visit was made to the local Administrative Record repositories at the Oscoda Public Library, now relocated to the Robert Parks Library, 6010 Skeel Avenue, Oscoda, and the Au Sable Township Hall, 311 Fifth Street, Oscoda to review the documents. Because the library had moved to Wurtsmith AFB, the AR was no longer on file. Similarly, the Au Sable Township Hall did not have an updated AR. The RPM indicated that a complete AR would be sent to both locations.

Interviews

Several community interviews were conducted on July 20-21, 2004 (see Attachment 8) and included: Global Environmental Engineering staff who perform weekly Site O&M activities; the Au Sable Township water superintendent, the regional director of the public libraries; Au Sable Township Clerk. The Au Sable Township and Oscoda City contact lists are also included in Attachment 8.

On July 21, Andrew Girard of Global discussed Site O&M issues with the EPA and MDEQ representatives. The agencies discussed the need to collect hydraulic and water quality data from the correct locations to ascertain whether the system was working effectively. The agencies provided minimal recommendations necessary to determine the current plume configuration. Global indicated that the flow meters in each extraction well had been used for a long time but were removed due to constant clogging by iron bacteria. Well performance is now based on total flow in the system. A noticeable drop in pressure is indicated by the pressure gauge in each well. The line can be closed off to get the total flow for each well. The agencies indicated that the system efficiency was currently based on flow, which is really independent of efficiency, and that the specific capacity for each well must be obtained. Extraction wells are cleaned annually using high pressure air sparging.

The agencies discussed the procedures followed when an EW goes down. These occurrences are reported in a field log book. The average down time for an EW is 1-3 weeks. The longest down time was 14 months for EW-2 as previously mentioned. Down time is usually due to replacing transmitters, relay switches, and receivers. If the problem is more serious, the well is shut down and an electrician is called in by the following week. A major problem with the system is that it is old and many things can go wrong. The RP and Global anticipates a switch to a wireless system which uses radio telemetry and telephone lines for transmission. Such a system would reduce the maintenance and down time significantly, thereby improving efficiency. In 2001, all the extraction well pumps except EW-3 were replaced. EW-3 was replaced in 2003.

During the July 21-22 visit, a significant amount of time was spent with Au Sable Township water superintendent, Cal Taylor, to determine whether any residences in the Au Sable Heights subdivision were not connected to the regional water supply. Mr. Taylor two categories of residents potentially at risk: 1) residents that use private well water for all potable uses; and, 2) residents using the township supply for potable uses, but still used their private well water for watering lawns and gardens. He was also concerned about the potential for subsurface vapor intrusion, given the approximate 20-foot depth of the sandy soil above the hard clay unit. Most houses have shallow basements of 5-7 foot depth or crawl spaces. The houses in the Au Sable subdivision were built in the 1970's and may not have included vapor barriers under the crawl spaces. Mr. Taylor identified five residences falling into the first category, i.e., using private wells for potable water. Four houses were located on Franklin Street and one on Sunset Street (see attached map). In addition, he located another home on Franklin and three on River street falling in the second category. He suggested that the subdivision residents could be updated more frequently about the status of the cleanup. Some residents who had lived there since the beginning of the cleanup were still not aware of the contamination. In other cases, people who were not the original owners or who relocated to the area having no knowledge of the contamination purchased homes that had not been connected to the regional supply.

EPA immediately contacted the residents and property owners to set up a sampling date. EPA utilized an emergency response contract (TDD No. S05-0408-007) to sample those residences. On September 7, 2004, EPA RPM Sheila Sullivan, accompanied by EPA contractor Tetra-Tech EM Inc., EPA CIC Robert Paulson, MDEQ geologist Matthew Baltusis, Global engineer Andrew Girard. The Au Sable Water Superintendent Mr. Taylor returned to the Site to assist with access and sampling locations. Tetra Tech sampled three of the five residences using private wells for drinking water. One full-time resident refused to be sampled. The other residence, used as a cabin on an irregular basis, was not able to be sampled as the owner was unavailable. Also sampled were two residences that are connected to the regional water supply but use their private wells for lawn and garden watering (see attached map). As a resident of Au Sable Heights, Mr. Taylor indicated that he had never witnessed any vandalism to the extraction or monitoring wells.

Several other discussions occurred since July 21st with a resident of the Au Sable Heights subdivision who was concerned about the potential for soil vapor intrusion in his crawl space.

The RPM used the groundwater concentrations at the nearby monitoring well to perform a screening using EPA's November 2002 guidance: *Evaluating the Vapor Intrusion into Indoor Air (EPA530-F-02-052)*. Preliminary screening indicates that a potential risk may exist; however, more specific data must be collected, such as soil gas samples, to accurately assess the risks.

On September 7, 2004, EPA and MDEQ representatives also met with Mr. Desmond Lynch, President of the ATS Company. Mr. Lynch's company manufactures instruments for home builders of experimental aircraft. He indicated that, aside from the resident mentioned in the preceding paragraph, he had never been asked about the property with regard to past activities that had occurred there. He said that the Site has had no impact on his company or the immediate environment. He felt well-informed about Site activities. He indicated that the property was industrially zoned and that there were no other uses planned for the property, which is owned by AWB Corporation and leased to ATS Company. There are no additional industries coming into the area, and in fact, more industries, particularly those affiliated with the automotive industry are leaving the area. Mr. Lynch sees adolescents regularly trespassing but does not favor erecting a fence as it would present an attractive challenge (see Figure 7).

VII. Technical Assessment

Question A: *Is the remedy functioning as intended by the decision documents?*

Remedial Action Performance

Based on a review of relevant documents, applicable or relevant and appropriate requirements (ARARs), the results of the site inspection, and monitoring and O&M data, the remedy appears to be functioning as designed by the ROD and attendant documents for the most part and is expected to continue in this manner. The effectiveness and progress of the remedy has been tracked through the monitoring program. Site monitoring in accordance with the requirements listed in Table 3 has been performed since 1993 and encompasses data from two years worth of quarterly monitoring and nine years of semiannual monitoring events. These data, as depicted in Attachment 5, indicate that the Hedblum Site RA has not operated optimally due to many system problems caused by high iron levels in the groundwater and design problems involving the relay switching and telemetry system. The remedy is therefore expected to continue operating beyond the originally projected time frame of five years, as the Site still poses a potential threat to human health.

The RA for this Site consists of a three-well extraction well system in the Au Sable Heights subdivision and one extraction well on-site downgradient from the plant; pumping extracted groundwater through three granular activated carbon adsorption tanks to remove VOCs; discharge from the treatment system to the Au Sable bayou; and monitoring groundwater quality of the aquifer during the treatment process (affected residents with operating wells will have their wells monitored or will receive an alternate supply or potable water); abandon six MDNR monitoring wells on the Hedblum property; and perform additional subsurface soil

monitoring to further define the magnitude and extent of soil contamination. The selected remedy did not include an institutional controls component.

All construction activities have been completed and the RA has been ongoing. Over the years, several changes have been made to the system which have improved its overall effectiveness. While VOC contamination, namely TCE and PCE, is still present in the groundwater above the cleanup criteria stated in the ROD, i.e., MCLs and similar risk-based criteria, the Site poses no general public health hazard, however, it may pose a hazard for those few residents still consuming groundwater from private wells. These wells have been sampled over the years, and most recently, on September 7, 2004. The contaminated areas of this Site include the groundwater and the subsurface soil.

In order to assure the protection of the Au Sable bayou and river, the treated groundwater effluent discharged to the bayou is subject to the substantive monitoring and water quality requirements of an NPDES permit, embodied in the state SRD. The SRD requirements, modified by MDEQ in April 1996, required at least three monthly rounds of metals monitoring and three monthly toxicity tests. In June 26, 1996, Amtel submitted one round of metals testing from the effluent and a background well. Since March 2000, Amtel has provided the requisite compliance and monitoring reports. After reviewing these reports, EPA has determined that Amtel appears to have made an effort to perform the necessary testing. The issue of whether the remedy is effectively capturing the contaminant plume has been difficult to assess due to the incomplete nature of the groundwater monitoring data. This is partially due to the fact that not all of the wells are used to collect monitoring data, but also due to design deficiencies in the monitoring system, i.e., insufficient number and locations of monitoring wells.

Consequently, the figures produced in the quarterly monitoring reports do not indicate the influence of any of the extraction wells. The current network of monitoring points to evaluate hydraulic capture is inadequate. The monitoring points are not placed in the proper locations and there is an insufficient number of monitoring points to adequately demonstrate hydraulic capture. Hydraulic capture is evidenced by having enough monitoring points to measure the gradient in a radial direction from the extraction point and a sufficient extraction rate to indicate a gradient toward each extraction point. The number of data points is necessary to achieve the proper resolution to determine where the groundwater surface is located around each extraction point. A contour map of the water levels is the product generated to depict the groundwater surface to indicate low groundwater elevation near the extraction wells. With the proper data points, contouring should show the influence of the extraction wells.

In order to show contours influenced by an extraction well, water-level monitoring points have to be installed near the extraction well and within the capture zone. The agencies recommend the installation of additional monitoring points to refine the contouring in the vicinity of each extraction well (near EW-3 and EW-4). In order to contour the data, a minimum of three points are required to calculate a gradient. Contouring water-level data using the water-level measured in the extraction wells is not completely reliable for interpreting hydraulic

capture due to well losses, pumping rate variations, etc. Other wells should also be used. The horizontal gradient should be used to determine capture at various locations near a single extraction well.

The quarterly Groundwater Monitoring Reports provided by Global lack sufficient data and analyses to appropriately evaluate the performance of the system. The report should include more detail regarding:

- Extraction well rehabilitation
- Reporting of downtime
- Advance notice of when carbon change out is to occur
- Field sampling notes
- Trend analysis of groundwater sampling data
- Reporting of individual well extraction rates

The agencies recommend an increase in the level of effort for the following:

- More frequent system maintenance
- Decrease the amount of time an extraction well is offline
- Utilize low-flow sampling methods

System Operations/O&M

The operating procedures have not been fully effective in maintaining the performance of the response actions. According to Global, this is due in part to the ineffective design of the treatment, extraction and monitoring well systems. O&M procedures are performed on a weekly basis, and on an "as needed" basis when issues arise. Frequent equipment breakdowns and problems can negatively impact the protectiveness of the remedy by compromising the effectiveness of the plume capture system. This was evidenced by the 14-month down time of EW-2 which reduced the overall extraction capacity of the system; EW-2 is the highest capacity well.

As mentioned, it is anticipated that the telemetry system will be upgraded from a relay switch to wireless radio signal system. While this is anticipated to raise costs initially, the O&M costs may decrease overall due to less system down time and electrician labor costs, time and costs incurred for replacement of relay switches, fuses, receivers and other parts.

Opportunities for Optimization

Some opportunities exist for improving the performance of the treatment system and monitoring. These opportunities are not expected to reduce costs and in fact, will increase overall monitoring costs. The recommendations presented below are conceptual; the details of which will be provided in an upcoming addendum to this document:

- Install nested piezometers to show backward gradient between EW-1 and EW-2.

- Install down gradient sentinel wells (down gradient from piezometers between EW-1 and EW-2) for water quality monitoring.

- Perform VAS and install soil borings for volatile organic compounds (VOCs) to address the high concentrations of TCE at MW-12 and MW-13. This involves:

    - Install VAS borings (50-foot spacing) along River Road between MW-10 to approximately 200 feet southeast of MW-12. Boring locations should be selected such that one is within 25 feet of MW-13 (measured transverse to groundwater flow).

    - Install VAS borings (50-foot spacing) in a line west of the Detroit and Mackinac Railroad tracks between MW-9 and MWs 1S and 1D.

    - Install soil borings based on the VAS results. This may include the vicinity of MW- 8.

- Install nested monitoring wells to define the southeast edge of the plume (southwest of MWs 5S and 5D and northeast of MWs 4S and 4D). The locations will depend on VAS results. A single monitoring well is not sufficient to define the edge of the plume.

- Install nested monitoring wells to define the northern edge of the plume. Again, the locations will depend on VAS results. A single monitoring well is not sufficient to define the edge of the plume.

- Collect quarterly hydraulic data from all existing monitoring wells/piezometers. and individual and total pumping data from all extraction wells.

Implementation of Institutional Controls and Other Measures

Institutional controls were not a component of the remedy as per the 1989 ROD as it was not deemed necessary to restrict access to and use of the Site and the surrounding property for any purpose. There are no physical barriers to the Site property such as fencing or posted signs. The property zoning on which the ATS facility and SPX Corporation treatment plant are situated is restricted to industrial use. There are no other planned uses for the property in the future other than the present use. There is no accessible contaminated soil at the Site, however deeper soils near the original source area may be contaminated. There are no controls prohibiting the use of groundwater beneath the Site as it was originally anticipated that the groundwater plume would be remediated within five years. Presently, the regional water supply is extended to all industrial, commercial, and residential properties save for the five residences in the Au Sable Heights subdivision that were not connected to the system. These residences were sampled on September 7th and the preliminary results, available September 30th, will determine whether immediate actions must be taken to protect the health of the residents. After the plume characteristics are

determined and the samples from the five residences are evaluated, the agencies will review the need for institutional controls. Such review will include information on the local land use restrictions on the use of contaminated ground water.

Question B: *Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?*

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been changes in the cleanup standards identified in the ROD. These changes were mentioned in the September 1999 five year review and are discussed below.

Changes in Standards and TBCs

Chemical-Specific ARARs

The ROD and UAO established that the RD/RA performed will pump and treat the contaminated groundwater until chemicals of potential concern (COPC) identified in the ROD have an additive risk level equal to or less than $1x10^{-6}$ excess lifetime cancer risk. The ROD also established that for those COPCs with established MCLs, as promulgated under the Safe Drinking Water Act, these MCLs will also be met, at a minimum. The effluent to the bayou must meet, at a minimum, applicable NPDES effluent limits. Those limits are presented in the State SRD. The MCLs for the COPC at the time the ROD was signed, as well as those promulgated up to the present time are presented in Table 8. The MCLs established the minimum cleanup criteria for the groundwater plume and the discharge limits to surface water and were regarded as being commensurate with EPA's policy of achieving a cumulative risk of $1x10^{-6}$ excess lifetime cancer risk. Since the ROD was issued, some existing MCLs have been revised and others have been newly promulgated for the COPCs, as listed in the preceding table. Given the fact that TCE is currently undergoing a reassessment of cancer potency, the agencies may need to reevaluate the status of the cumulative risk to humans, as well as the toxicity of the surface water to aquatic life prior to the next five-year review in order to determine whether the remedy is protective of human health and the environment.

Act 245, Part 21 of the Michigan Environmental Protection Act and the Clean Water Act require an NPDES permit for waste effluent discharge into the waters of the State, and reporting of the wastewater discharge. The ROD specified that the substantive requirements of this Act will be met without administratively acquiring a permit. CERCLA section 121(e) exempts on-site activities from obtaining permits. The purpose of this exemption is to allow CERCLA response actions to proceed without the delays that could result while waiting for other offices or agencies to issue a permit. Amtel acquired the SRD (#MIU990001), which established the discharge limits for treated effluent discharged to the bayou. As of December 21, 2002, the State of Michigan replaced its Type B criteria estimated for groundwater by the Administrative Rules for Part 201 (Generic Cleanup Criteria and Screening Levels for Groundwater), Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. In addition, MDEQ developed the acceptable indoor air concentrations (AIACs) as a

starting point for back-calculating the Part 201 Groundwater and Soil Volatilization to Indoor Air Inhalation Criteria and the Part 213 Groundwater and Soil Volatilization to Indoor Air Risk-Based Screening Levels. As such, these levels provide an acceptable residential indoor air concentration.

Action-Specific ARARs

There were no changes in Action-Specific Requirements, however, if the discharge rate to the bayou were to increase, it may necessitate a revision to the SRD.

Location-Specific ARARs

There were no changes in Location-Specific Requirements

Changes in Exposure Pathways

During the conduct of the RI/FS, the exposure pathways of greatest concern at the Site, i.e., exceeded the excess lifetime cancer risk of $1x10^{-6}$ included: 1) the exposure to VOCs from the ingestion of groundwater; and, 2) exposure to contaminants via the ingestion of fish from the Au Sable bayou. These risks are likely to be overestimated based on the bioconcentration factors used to estimate fish ingestion risks. These exposure pathways are still considered relevant since the exposures of concern have not been completely interrupted in all cases, although they have been reduced. The groundwater ingestion pathway still exists for some residents in the Au Sable subdivision, however the VOC concentrations at these houses are currently being analyzed and the results will be available September 30th.

One exposure pathway at the Site for which there is greater evidence since the last five year review involves the intrusion of volatile organic contaminants via subsurface soil vapor. Volatile organic groundwater contaminants in the vadose zone are able to move through the sandy porous soil and potentially seep into residential basements and crawl spaces. Factors affecting exposure include but are not limited to: the volatility of the contaminants; the soil type; configuration of the residence; vertical and horizontal distance from contaminants; the existence of preferential pathways for contaminants to travel, such as drains and utility conduits; and, background concentrations.

Several chemicals of concern at this Site are of sufficient volatility (Henry's Law Constant $>10^{-5}$ atm m^3/mol) and toxicity (incremental lifetime cancer risk $>10^{-6}$ or Hazard Index >1) to present a vapor intrusion risk One residence in question had both extraction well and monitoring wells located within approximately 100 feet of the water table containing known contaminants, although the presence of significant preferential pathways for vapor migration were not known but assumed to be present. As no soil gas data are available in the Au Sable Heights subdivision, the most recently measured groundwater contaminant concentrations (TCE at 660 ppb, TCA at 25 ppb, PCE at 46 ppb, DCA at 6.2 ppb) in this location were used. It was assumed that no other subsurface sources were present in the unsaturated zone. The groundwater concentrations were compared to the generic target media-specific concentrations corresponding to an indoor air concentrations associated with incremental lifetime cancer risks. These generic criteria reflect

reasonably worst-case conditions. For screening purposes, the chemical driving the risk (TCE) was evaluated using the November 2002 EPA guidance: *Evaluating the Vapor Intrusion into Indoor Air* (EPA530-F-02-052). The actual groundwater TCE concentration exceeded the TCE target concentration (5.3 ppb) by a factor greater than 50 for a 10^{-4} risk level– the upper limit of what EPA considers to be the acceptable risk range. The corresponding indoor air concentration is 2.2 micrograms per cubic meter (ug/m^3) at the 10^{-4} risk level. The acceptable indoor air concentrations as per Michigan Part 201 (Groundwater and Soil Volatilization to Indoor Air Inhalation Criteria) and Part 213 (Groundwater and Soil Volatilization to Indoor Air Risk-Based Screening Levels) provide an acceptable residential indoor air concentration for TCE of 14 ug/m^3 and for industrial/commercial of 58 ug/m^3.

In order to evaluate the situation further, attenuation factors were applied to obtain a more representative but less conservative picture of the Site. As per the monitoring well boring logs, it was assumed that a sandy soil with less than 12 % fines was present. A depth of 35-45 feet from house foundation to the contamination was also assumed. Based on the sandy soil type and depth, a vapor attenuation factor range of 4.5×10^{-4} to 6.0×10^{-4} was applied, producing a target TCE groundwater concentration range of 9.25 to16.3 ppb corresponding to a 10^{-4} excess lifetime cancer risk, and a concentration of 5.0 ppb corresponding to a 10^{-5} excess lifetime cancer risk[2]. The TCE concentration of 660 ppb is more than an order of magnitude (10 times) greater than the highest end of the acceptable risk range. The presence of the other groundwater contaminants will add to this risk.

This preliminary assessment indicates that further action, such as soil gas sampling, needs to be conducted in this area of higher plume concentrations in order to more accurately assess the potential risks from this pathway. No other additional exposure pathways have come to light that would impact the protectiveness of the remedy.

Changes in Toxicity and Other Contaminant Characteristics

There have been changes in toxicity values since the RA was initiated at the Hedblum Industries Site. These have namely included the chemicals: PCE, TCE, bis(2-ethylhexyl) phthalate, lead and barium. However, these changes do not impact the protectiveness of this remedy.

Changes in Risk Assessment Methods

There have been no changes in risk assessment methods that would impact the protectiveness of this remedy.

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[2] The target concentration for TCE is based on the upperbound cancer slope factor identified in EPA's draft risk assessment for TCE (U.S.EPA 2001). The slope factor is based on state of the art methodology, however the TCE assessment is still undergoing review, and these numbers are subject to change in the future.

Expected Progress Toward Meeting RAOs

The remedy has progressed slower than expected as discussed in previous sections of this report. However, recommendations have been made in this report which will facilitate the achievement of all remedial action objectives in the future.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*

There is no new information that has come to light, aside from the previous discussions in this report, that could affect the protectiveness of the remedy.

TABLE 8 - CHANGES IN CHEMICAL-SPECIFIC STANDARDS

Contaminant	Media	Cleanup Level (e)	Standard (ug/L or ppb)		Citations (f)
trans-1,2-DCE	Groundwater	None Established	Previous	---	SDWA MCL; 1976 PA 399, MCL 325.1005
			New	100	
Tetrachloroethylene (PCE)	Groundwater	**None Established**	Previous	---	SDWA MCL; 1976 PA 399, MCL 325.1005
			New	5.0	
Dichloromethane (Methylene Chloride)	Groundwater	None Established	Previous	---	SDWA MCL; 1976 PA 399, MCL 325.1005
			New	5.0	
Toluene	Groundwater	None Established	Previous	----	SDWA MCL; Part 201, Rule 750
			New	1,000/ 790	
Xylenes (total)	Groundwater	None Established	Previous	----	SDWA MCL; Part 201 Rule 750
			New	10,000/ 280 (c)	
Aluminum	Groundwater	None Established	Previous	---	SDWA SMCL; Part 201 Rule 750
			New	50-200*/ 50 (b)	
Barium	Groundwater	1,000	Previous	1,000	SDWA MCL; 1976 PA 399, MCL 325.1005
			New	2,000	
Iron	Groundwater	None Established	Previous	---	SDWA, 199 ;Part 201 Rule 750
			New	300* (c)	
Lead	Groundwater	1.0	Previous	1.0/ 10.0	SDWA, 199 Part 201 Rule 750
			New	15 (a)/ 4.0 (d)	
Zinc	Groundwater	None Established	Previous	---	SDWA Part 201 Rule 750
			New	500*/ 2,400	

(a) Regulated by action level which, if exceeded in more than 10% of tap water samples, triggers the implementation of treatment techniques.

(b) Aesthetic drinking water value as required by section 20120 (a) (5) of the act. Levels up to 200 ppb may be acceptable and still allow for drinking water use.

(c) Criterion is the aesthetic drinking water value as required by section 20120 (a) (5) of the act.

(d) Criteria derive0120 (a) (10) of the act. A level up to the State Action Level of 15 ppb may be allowed as a site-specific remedy.

(e) Cleanup criteria are indicated as per the time of the ROD (1989). The currently accepted Site cleanup criteria are the more stringent of the new standards listed in the "Standards" column.

(f) Citations provided are the U.S. EPA Safe Drinking Water Act MCLs and SMCLs promulgated in contaminant groupings, and the MDEQ Part 201 Generic Cleanup Criteria and Screening Levels for groundwater use as residential drinking water. These values are derived in part from the State of Michigan drinking water standards established pursuant to section 5 of 1976 PA 399, MCL325.1005.

-- No criteria available

* Secondary MCL (SMCL), which is solely based on aesthetic qualities of the water.

Technical Assessment Summary

Based on a review of relevant documents, applicable or relevant and appropriate requirements (ARARs), the results of the site inspection, and monitoring and O&M data, the remedy appears to be functioning for the most part and is expected to continue in this manner. The monitoring program data, which indicate the progress of the RA, show that the Hedblum Site RA has not operated optimally due to many system problems caused by high iron levels in the groundwater and design problems involving the relay switching and telemetry system. The remedy is therefore expected to continue operating beyond the originally projected time frame of five years, as the Site still poses a threat to human health.

All construction activities have been completed and the RA is ongoing. Over the years, several changes have been made to the system to improve its overall effectiveness. While VOC contamination, namely TCE and PCE, is still present in the groundwater above the cleanup criteria stated in the ROD, i.e., MCLs and risk-based criteria, the Site poses no general public health hazard. It may, however, pose a hazard for those few residents still consuming groundwater from private wells. These wells have been sampled over the years and most recently on September 7, 2004.

Assessing the effectiveness of the plume capture system has been problematic due to the incomplete nature of the groundwater monitoring system and available data. This is not due to a monitoring compliance issue, but rather to deficiencies in the design of the monitoring system. The agencies recommend the installation of additional monitoring points to appropriately evaluate the performance of the system.

The ROD and UAO established that the RD/RA performed will pump and treat the contaminated groundwater until chemicals of potential concern (COPC) identified in the ROD have an additive risk level equal to or less than $1x10^{-6}$ excess lifetime cancer risk. The ROD also established that for those COPCs with established MCLs, as promulgated under the Safe Drinking Water Act, these MCLs will also be met, at a minimum. The effluent to the bayou must meet, at a minimum, applicable NPDES effluent limits. Those limits are presented in the State SRD.

The only potential exposure pathway not previously identified involves the subsurface soil vapor intrusion pathway. Preliminary screening indicates that further data collection activities, such as soil gas sampling, in the area of the Au Sable Heights subdivision showing high groundwater concentrations may be needed. No changes in risk assessment methods were identified that would impact the protectiveness of the remedy. There have been changes in toxicity values since the RA was initiated at the Hedblum Industries Site. These have namely included the chemicals: PCE, TCE, bis(2-ethylhexyl)phthalate, lead and barium.

Environmental Indicators

An analysis of the environmental indicators with regard to controlled human exposures and controlled groundwater migration was performed. Whereas in June 2003, EPA concluded that all identified human exposure pathways from contamination at the Site were under control or below health-based levels for current groundwater use conditions, recent information suggests that some identified human exposure pathways from contamination at the Site may neither be under control nor be below health-based levels for current land and groundwater use conditions. Since completed pathways appear to exist between the contamination and human receptors, exposures can potentially occur.

As per the June 2003 determination, the groundwater contamination was documented as exceeding regulatory levels and risk-based levels, however, the contamination was being managed more effectively than it has been in the past as evidenced by the increased groundwater extraction rates. Until an assessment of capture efficiency is completed, it is not possible to determine whether contaminated groundwater is stabilized at the Site. The treated groundwater effluent is below risk-based criteria and discharges into a surface water body that is accessible to human and environmental receptors.

VIII. Issues

TABLE 9 - ISSUES

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Existing monitoring and piezometer wells need to be used more effectively to monitor the capture and remediation of the groundwater plume. It is difficult to produce a piezometric surface map of plume capture; hence, the current configuration of the plume is not known.	Y	Y
The groundwater extraction rate over the past five years has shown a great deal of variation from 1.4 gpm (11/02) to 112 gpm (5/04), extending the operation of the pump and treat system beyond the five year estimate.	Y	Y
Five residences in the Au Sable Heights subdivision still use private wells for drinking water. EPA sampled the wells on Sept. 7, 2004 to determine whether an alternate water supply is necessary.	N	Y
The electrical system behind the extraction well system is inefficient and outdated. For example, EW-2 was not operating from August 2002 through October 2003 due to electrical problems.	Y	Y

Preliminary assessments indicate that soil vapor intrusion may be a pathway of concern in the Au Sable Heights subdivision.	Y	Y
The SRD requirements for monthly toxicity tests on the influent and treated effluent discharge are not being conducted on a regular basis by the RP. MDEQ conducted a grab toxicity test (Sept. 10-17, 1997) showing chronic toxicity to *ceriodaphnia dubia*. The RP repeated test on January 1998 with same result. The RP subsequently conducted the required acute and chronic toxicity tests and submitted results to EPA and MDEQ in 2000. Results showed no exceedance of toxicity limits for both test organisms.	N	Y
Improved reporting methods providing more detail are necessary. For example, hydraulic data from all wells/piezometers and individual extraction well pumping rates.	N	Y
Elevated levels of TCE in samples caused the lab to dilute the TCE samples, thereby increasing the detection limits for some other compounds above the clean up criteria.	N	N

IX. Recommendations and Follow-up Actions

TABLE 10 - RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Issue	Recommendations and Follow-up Actions	Party Respon-sible	Over-sight Agency	Mile-stone Date	Affects Protectiveness (Y/N)	
					Current	Future
Existing monitoring and piezometer wells need to be used more effectively to monitor the capture and remediation of the groundwater plume. It is difficult to produce a piezometric surface map of plume capture; hence, the current configuration of the plume is not known.	Perform VAS and install soil borings. Install the necessary piezometers, sentinel wells, monitoring wells based on VAS results.	RP	EPA and MDEQ	To be determined	Y	Y

Issue	Recommendations and Follow-up Actions	Party Respon -sible	Over-sight Agency	Mile-stone Date	Affects Protectiveness (Y/N)	
					Current	Future
The groundwater extraction rate over the past five years has shown a great deal of variation from 1.4 gpm (11/02) to 112 gpm (5/04), extending the operation of the pump and treat system beyond the five year estimate. The extraction wells are treated with chlorine to break down accumulated iron and iron bacteria on the pump intake screen and piping. The system flow rate should not be allowed to fall significantly below the design flow rate for an extended period of time.	If the system flow rate is trending down to a level below the design flow rate, maintenance should be performed as soon as possible. The agencies recommend more rigorous annual well rehabilitation, consisting of a combination of acid and chlorine with vigorous surging using a drill rig or well maintenance rig.	RP	EPA and MDEQ	To be determined	Y	Y
Five residences in the Au Sable Heights subdivision still use private wells for drinking water. EPA sampled the wells on Sept. 7, 2004 to determine whether an alternate water supply is needed.	If the preliminary results (available Sept. 30, 2004) show unacceptable risk, the residence should be connected to the regional water supply. Further, the need for institutional controls will be evaluated.	RP	EPA and MDEQ	12/31/2004	N	Y
The electrical controls behind the extraction well system is inefficient and outdated, for example, EW-2 was offline from August 2002 through October 2003 due to electrical problems.	The RP is planning to convert to a wireless control and telemetry system which will improve the efficiency of the system.	RP	EPA and MDEQ	6/30/2005	Y	Y
Preliminary assessments indicate that soil vapor intrusion may be an exposure pathway of concern to residents in the Au Sable Heights subdivision.	If indicated, collect additional data, such as soil gas samples to determine whether risks are present.	RP	EPA and MDEQ	1/31/2005	Y	Y

Issue	Recommendations and Follow-up Actions	Party Respon -sible	Over-sight Agency	Mile-stone Date	Affects Protectiveness (Y/N)	
					Current	Future
The SRD requirements for monthly toxicity tests are not being conducted on a regular basis by the RP. The RP subsequently conducted the required acute and chronic toxicity tests and submitted results to EPA and MDEQ. Results showed no exceedance of toxicity limits for both test organisms.	Since toxicity tests on influent and effluent were performed under low flow conditions, assess the recommendation for an additional test under the approved design flow criteria. Require RP to submit formal request for ARAR waiver.	RP	MDEQ	1/31/2005	N	Y
Improved reporting methods providing more detail on system maintenance and extraction well individual and total pumping rates.	Provide weekly log-book inspection sheets and enhanced monitoring data, e.g., hydraulic data for all wells/piezometers.	RP	EPA and MDEQ	12/31/2004	N	Y
TCE sample dilution has increased the detection limits for some compounds above cleanup criteria	Notify laboratory to correct this problem	RP	EPA and MDEQ	1/31/2005	N	N

X. Protectiveness Statement

Protectiveness Deferred:

A protectiveness determination for the remedy at the Hedblum Industries Site cannot be made at this time until further information is obtained. Information supporting a hydraulic capture zone analysis was provided to EPA contractor Subterranean, Inc. of Duxbury, MA. The analysis will determine whether the contamination plume is effectively captured by the pump and treat system operating at the Site. Also, results from the residential well monitoring conducted on September 7, 2004 will indicate whether exposure to unacceptable groundwater contaminant levels has occurred. In addition, preliminary screening indicates that further data collection activities, such as soil gas sampling, in the area of the Au Sable Heights subdivision showing the highest groundwater concentrations may be needed. It is expected that these analyses will be completed by December 31, 2004. A protectiveness determination will be made soon thereafter.

XI. Next Review

The next five year review for the Hedblum Industries Site is required by September 30, 2009, five years from the date of this review.

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Figure 6- Locations of soil boring samples during Remedial Investigation
Figure 7 - Au Sable Township future land use map

Attachments

Attachment 1 - Weekly Site maintenance log sheet
Attachment 2 - Extraction well system monthly average flow rates
Attachment 3 - Public notice announcing start of second five-year review
Attachment 4 - List of documents reviewed for five-year review
Attachment 5 - Extraction and monitoring well contaminant concentration plots
5 A- Chemical concentration vs. time for each well
5 B- Well concentrations vs. time for major contaminants
Attachment 6 - Example of monthly discharge report summary (June 2004)
Attachment 7 - Five-year review inspection checklist
Attachment 8 - Au Sable and Oscoda Township contact lists
Attachment 9 - Photograph log of July 21-22, 2004 inspection

Appendices

Appendix 1 - 1987 Soil Gas Sampling Report

LIST OF DOCUMENTS REVIEWED

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United States Environmental Protection Agency (USEPA). October 30, 1991. Letter to Thomas Hoban regarding Concerns With RD/RA.

United States Environmental Protection Agency (USEPA). August 16, 1993. Preliminary Site Closeout Report, Hedblum Industries Superfund Site, Iosco County, Michigan.

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United States Environmental Protection Agency (USEPA). Integrated Risk Information System (IRIS) Data Base.

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United States Environmental Protection Agency (U.S. EPA). June 2001. *Comprehensive Five-Year Review Guidance, Office of Solid Waste and Emergency Response. Directive 9355.7-03B-P.*

United States Environmental Protection Agency (U.S. EPA). 2001. *Operation and Maintenance in the Superfund Program.* Office of Solid Waste and Emergency Response. OSWER 9200.1-37FS, EPA 540-F-01-004.

United States Environmental Protection Agency (U.S. EPA). November 2002. *Evaluating the Vapor Intrusion into Indoor Air (EPA530-F-02-052).*

ATTACHMENTS

Attachment 1 - Weekly Site maintenance log sheet
Attachment 2 - Extraction well system monthly average flow rates
Attachment 3 - Public notice announcing start of second five-year review
Attachment 4 - List of documents reviewed for five-year review
Attachment 5 - Extraction and monitoring well contaminant concentration plots
5 A- Chemical concentration vs. time for each well
5 B- Well concentrations vs. time for major contaminants
Attachment 6 - Example of monthly discharge report summary (June 2004)
Attachment 7 - Five-year review inspection checklist
Attachment 8 - Au Sable and Oscoda Township contact lists
Attachment 9 - Photograph log of July 21-22, 2004 inspection

ATTACHMENT 1

HEDBLUM WEEKLY SITE REPORT

MONTH _____

WEEK # _____

DATE: _____ TIME: _____ OBSERVER: _____ WEATHER: _____

INSIDE BUILDING

Total Gallons Treated: _____,_____,_____,_____,_____,_____,_____,_____ (9 digits)

(orange meter behind tank C on wall)

Total Flow From Extraction Wells: _____ gpm
(On control panel)

Discharge Pressure: _____ psi
(Gauge above photohelic meters)

Tank Order (example C,A,B): _____

Corresponding Pressure: _____

PURGE WELLS

	Oper. Status (On/off)	Total (Hours)	Pressure (psi)	Rate (gpm)	Meter Readings (gallons)
EW-1	_____	_____	_____	_____	_____ 0
EW-2	_____	_____	_____	_____	_____ 0
EW-3	_____	_____	_____	_____	_____ 0
EW-4	_____	_____	_____	_____	_____ 0

Check all Manholes (E-111, E-110, E-109, E-108): _____

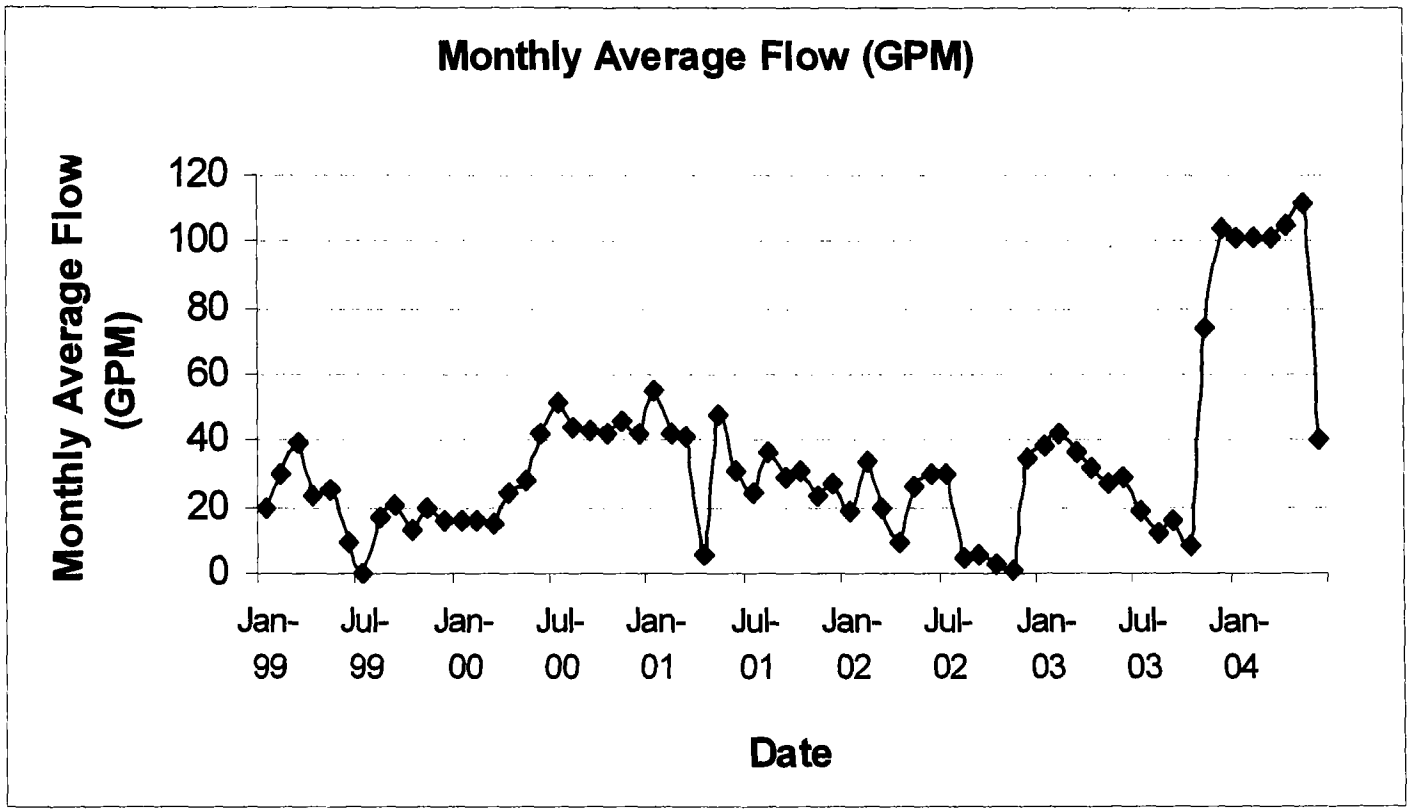
Check Outfall (Ok or problem): _____

List any tasks completed beyond regular O&M
(monthly sampling (don't forget PH), quarterly sampling, subcontractors on site, parts replaced or fixed, etc.)

_____

ATTACHMENT 2

Hedblum Industries Site, AuSable, Michigan



ATTACHMENT 3

United States Environmental Protection Agency

will start a five-year review of the

Hedblum Industries
Superfund Site
Oscoda, Iosco County, Michigan

EPA is conducting a five-year review of the cleanup remedy at the Hedblum Industries Superfund site. The review will include revisiting the site operations and maintenance plan for monitoring ground-water quality and over-all effectiveness of the on-going remedial action. The review is required to ensure the selected plan remains protective of human health and the environment. This review is scheduled to be completed by October 2004. The next five-year review is slated for September 2009.

Public comment is encouraged. Written comments should be postmarked no later than July 1, 2004.

Site information can be found at:

Oscoda Public Library
110 S. State St.
Oscoda, Michigan

Please send written or present oral comments to Robert Paulson. Additional site information can be requested from the team members listed below.

Sheila Sullivan
Remedial Project Manager
EPA Region 5 (SR-6J)
77 W. Jackson Blvd.
Chicago, IL 60604
(312) 886-5251
sullivan.sheila@epa.gov

Robert Paulson
Community Involvement Coordinator
EPA Region 5 (P-19J)
77 W. Jackson Blvd.
Chicago, IL 60604
(312) 886-0272
paulson.robert@epa.gov

Toll Free (800) 621-8431, 10 a.m. to 5:30 p.m. weekdays

LIST OF DOCUMENTS REVIEWED

Beckett and Raeder. 2003. Community Master Plan, Au Sable Township, Michigan.

Camp, Dresser and McKee, Inc., February 1989. Remedial Investigation Report for Hedblum Industries Site, Oscoda, Michigan. Work Assignment No. 320-5LE9.

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Global Environmental Engineering, Inc. June 5, 2000. Hedblum Industries Compliance Reporting.

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Global Environmental Engineering, Inc. April 27, 2000. Hedblum Industries Compliance Reporting.

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McLaren/Hart Engineers Midwest, Inc., August 13, 1992. Final Design Report, Hedblum Industries Site, Oscoda, Michigan., Prepared for Amtel, Inc., Project No. S0366-06.

McLaren/Hart Engineers Midwest, Inc., September 18, 1992. Results of June 12, 1992 Soil Sampling, Hedblum Industries Site, Oscoda, Michigan. Prepared for Amtel, Inc.

McLaren/Hart Engineers Midwest, Inc., August 11, 1993. Pumping Test Report, Hedblum Industries Site, Oscoda, Michigan. Prepared for Amtel, Inc., Project No. 07-0800753-002.

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Michigan Department of Environmental Quality. April 1996. Substantive Requirements Document for the Hedblum Industries Superfund Site.

Michigan Department of Environmental Quality. May 23, 2000. Compliance Sampling Field Inspection Report for the Hedblum Industries Superfund Site. Brian Jankowski, SWQD.

Michigan Department of Environmental Quality. December 21, 2002, Parts 201 and 213, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Michigan Department of Environmental Quality. May 6, 2004. Letter to U.S. EPA Regarding Review of December 2003 Effluent Sampling Data Report and the December 2003 Groundwater Monitoring Report, Hedblum Industries, Oscoda, Michigan.

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Michigan Department of Natural Resources. November 2, 1992. Letter to U.S. EPA Regarding June 12, 1992 Soil Sampling at the Hedblum Industries Site.

Michigan Department of Natural Resources. May 21, 1993. Substantive Requirements Document for the Hedblum Industries Superfund Site.

United States Environmental Protection Agency (USEPA). July 1989. Hedblum Industries Superfund Site Proposed Plan.

United States Environmental Protection Agency (USEPA). September 29, 1989. Record of Decision for the Hedblum Industries Superfund Site, Iosco County, Michigan.

United States Environmental Protection Agency (USEPA). January 4, 1990. Unilateral Administrative Order for Remedial Design and Remedial Action at the Hedblum Industries Superfund Site, Iosco County, Michigan.

United States Environmental Protection Agency (USEPA). January 4, 1990. Scope of Work for Remedial Design and Remedial Action, Hedblum Industries Superfund Site, Oscoda, Michigan.

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United States Environmental Protection Agency (U.S. EPA). June 2001. *Comprehensive Five-Year Review Guidance, Office of Solid Waste and Emergency Response. Directive 9355.7-03B-P.*

United States Environmental Protection Agency (U.S. EPA). 2001. *Operation and Maintenance in the Superfund Program.* Office of Solid Waste and Emergency Response. OSWER 9200.1-37FS, EPA 540-F-01-004.

United States Environmental Protection Agency (U.S. EPA). November 2002. *Evaluating the Vapor Intrusion into Indoor Air (EPA530-F-02-052).*

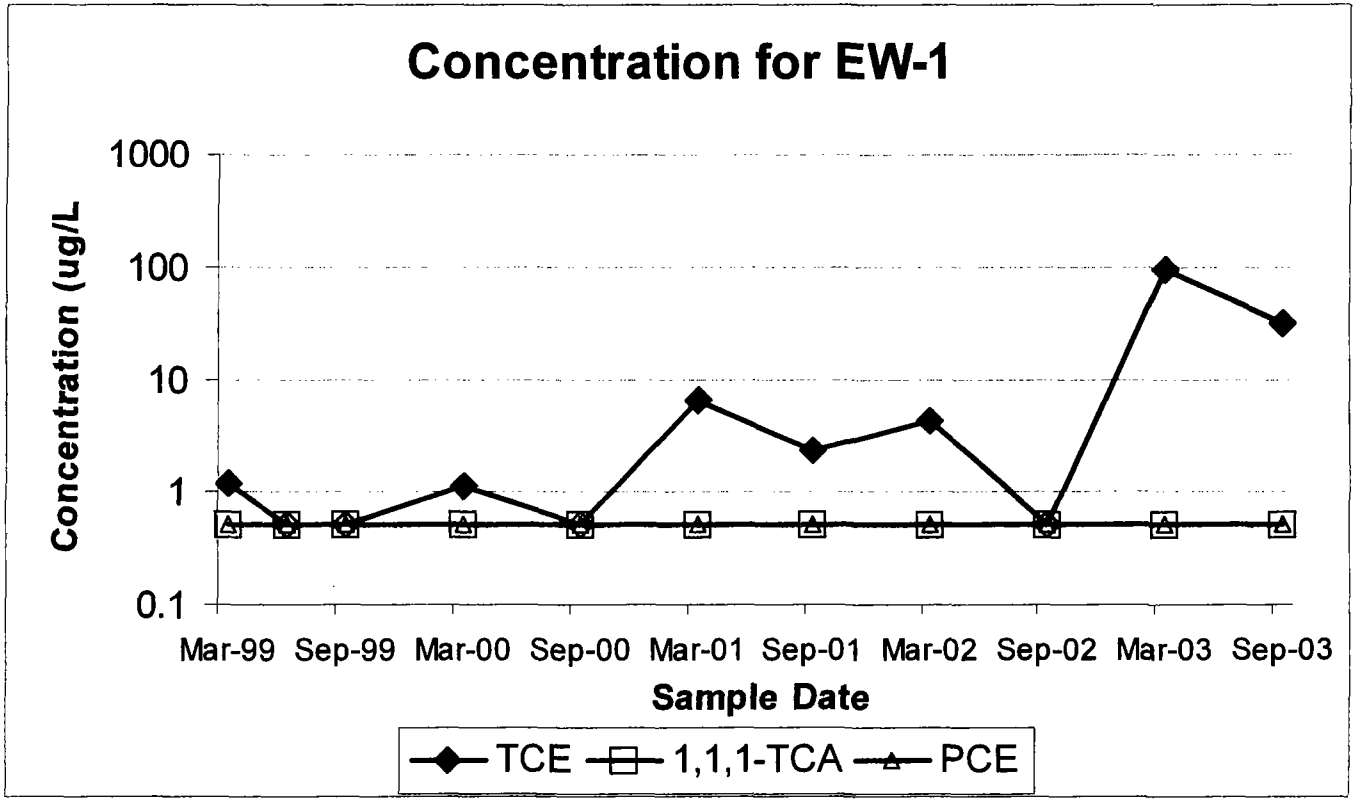
ATTACHMENT 5

Extraction and Monitoring Well Contaminant Concentration Plots

5 A- Chemical Concentration vs. Time for each well (pages 2-14)

5 B- Well Concentrations vs. Time for major contaminants (pages 15-17)

Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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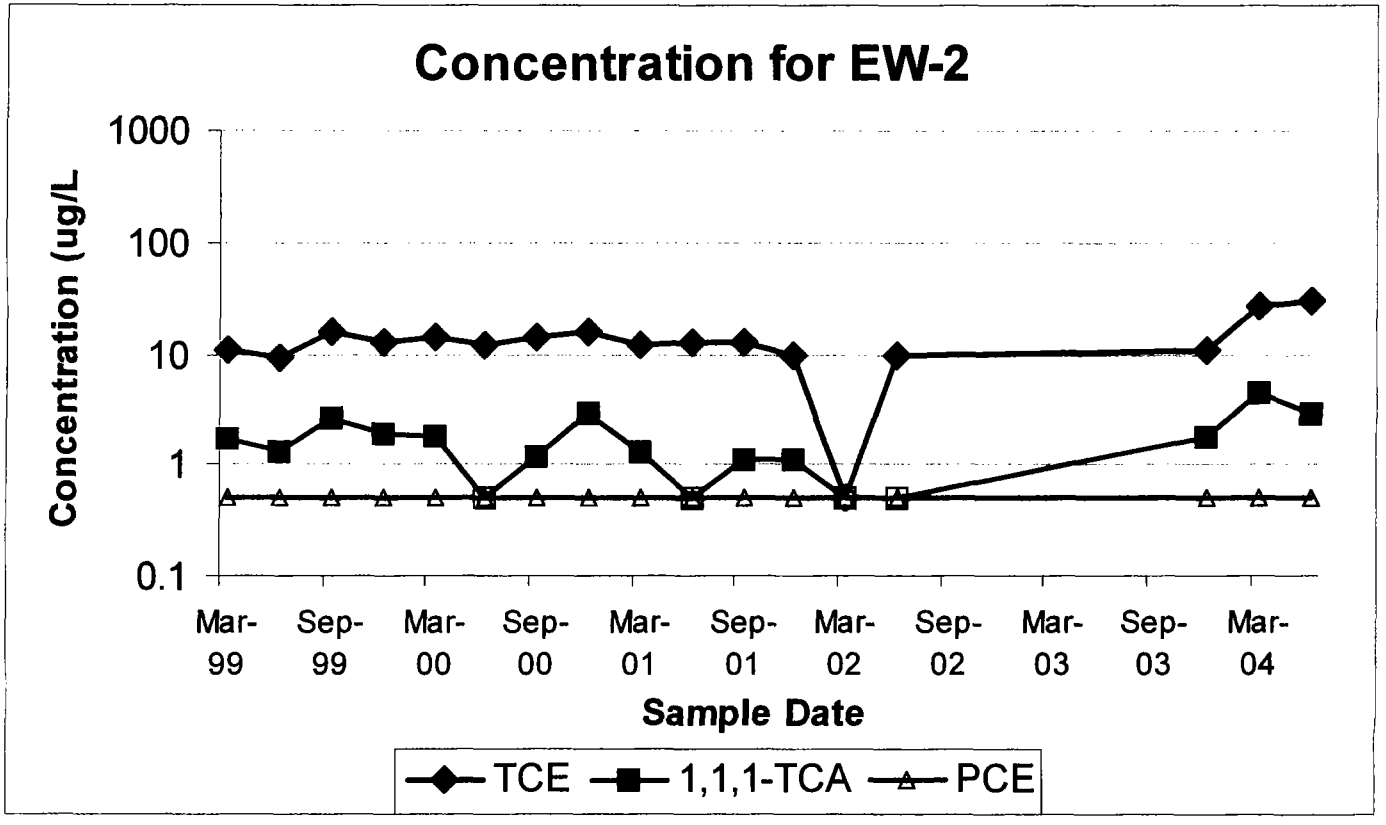
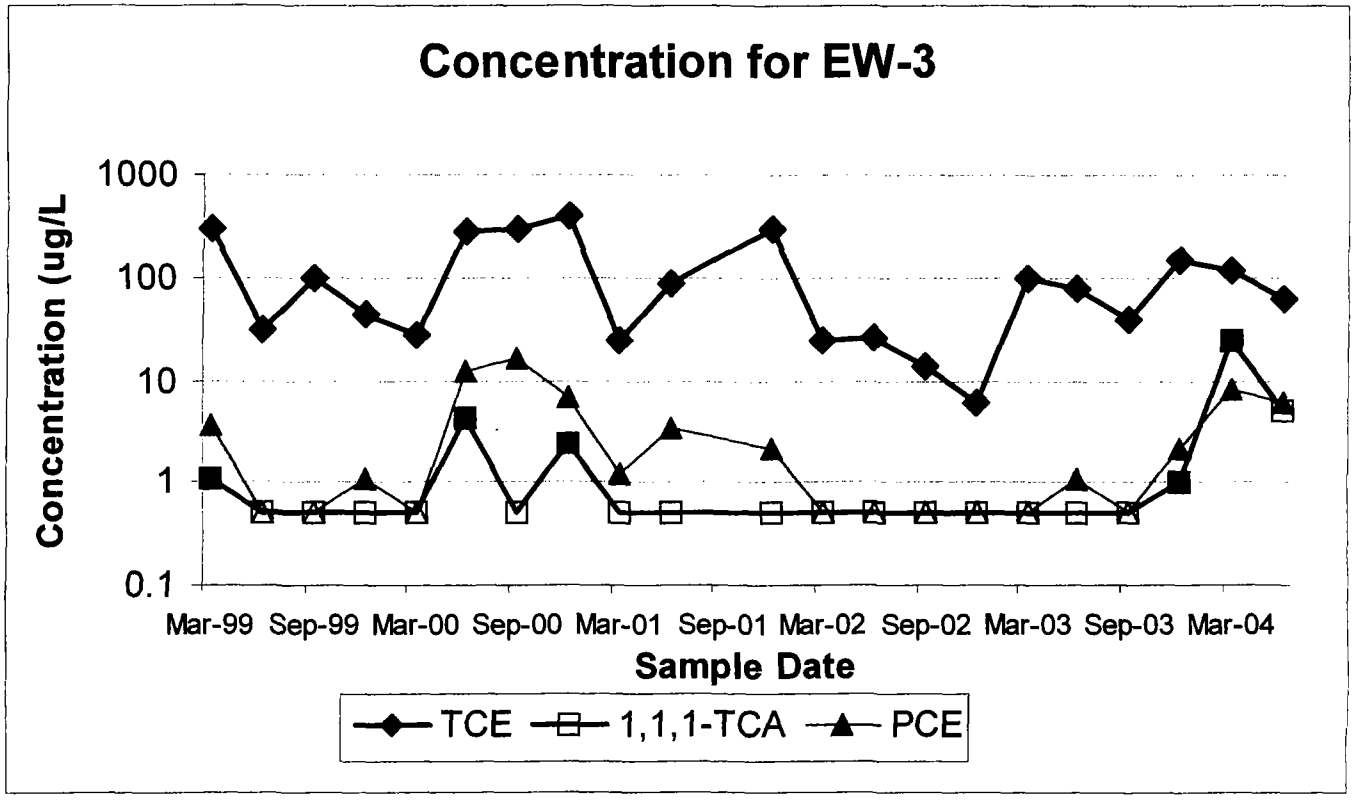
Att. 5A

Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



Non detect assigned a value of '0.5' and represented by hollow markers e.g. △

Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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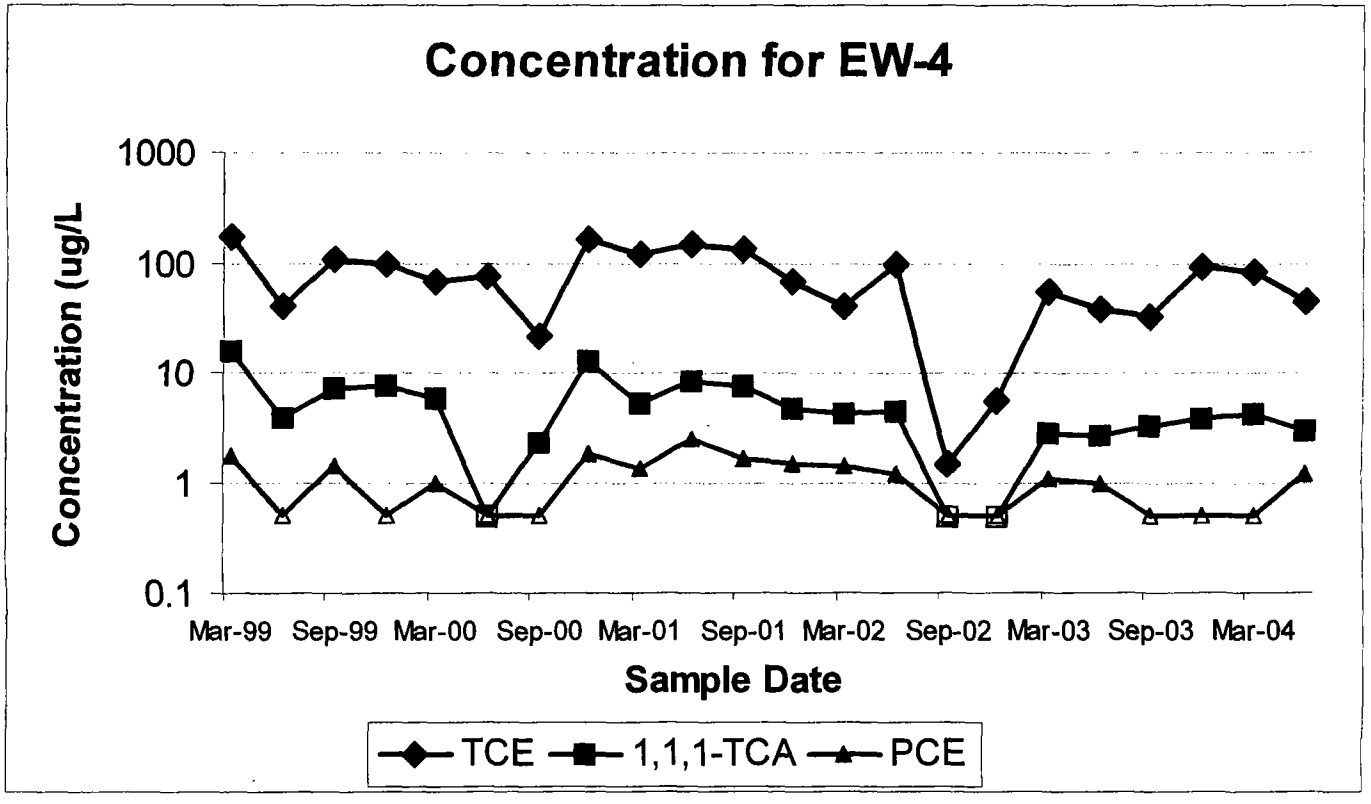
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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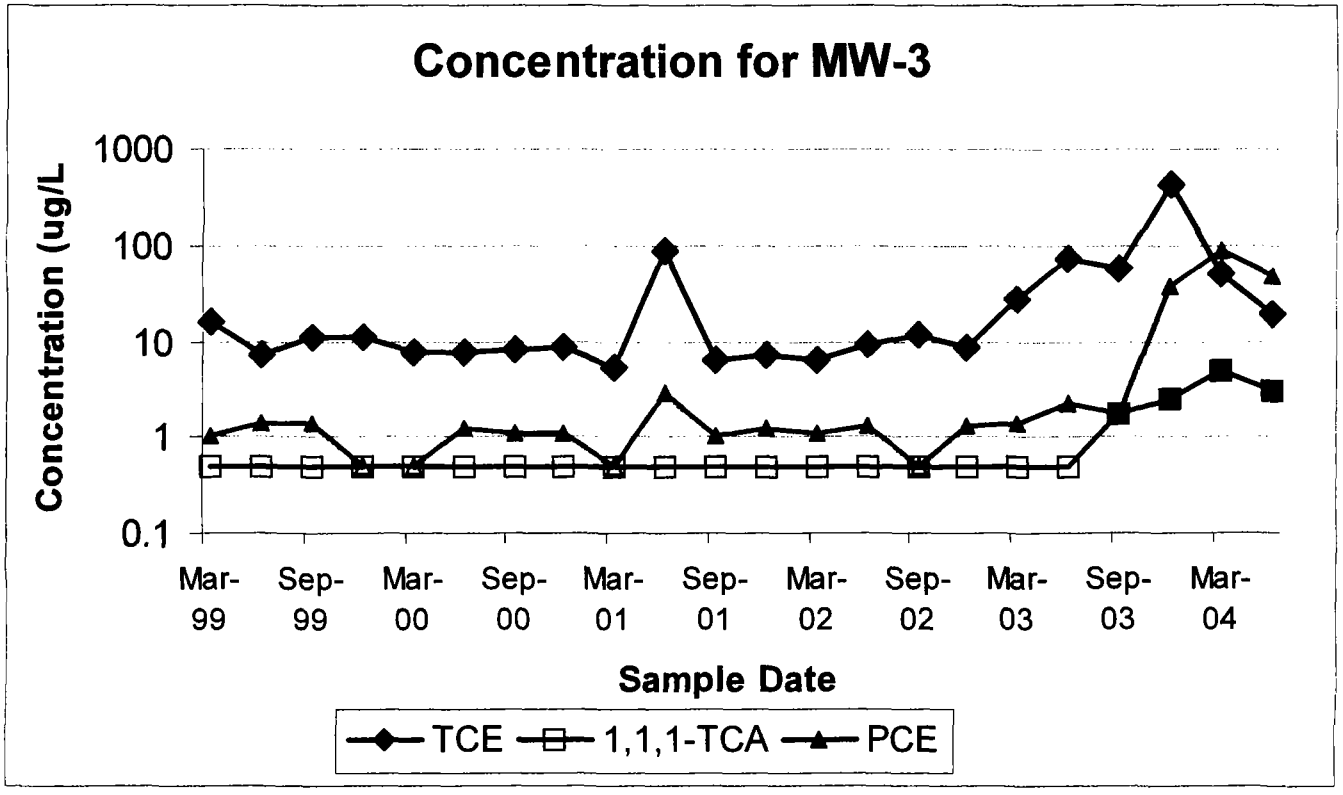
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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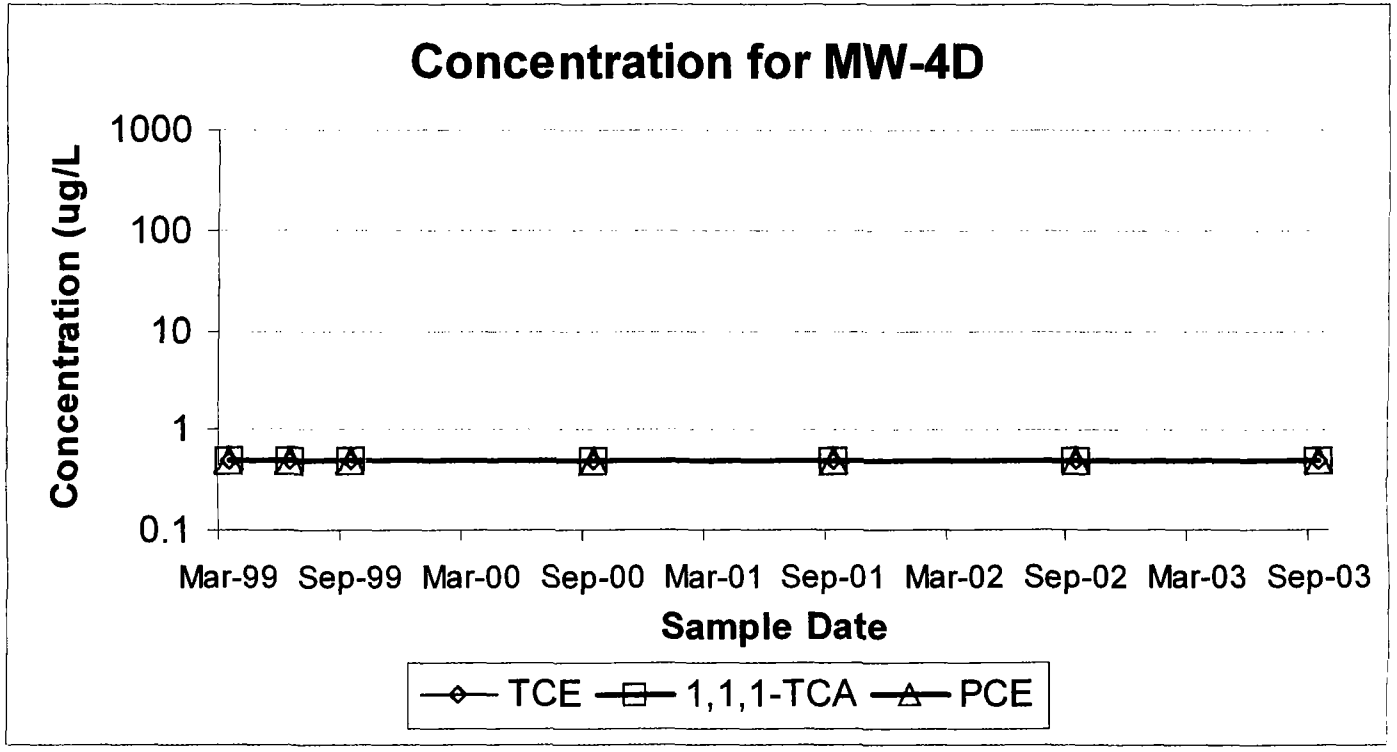
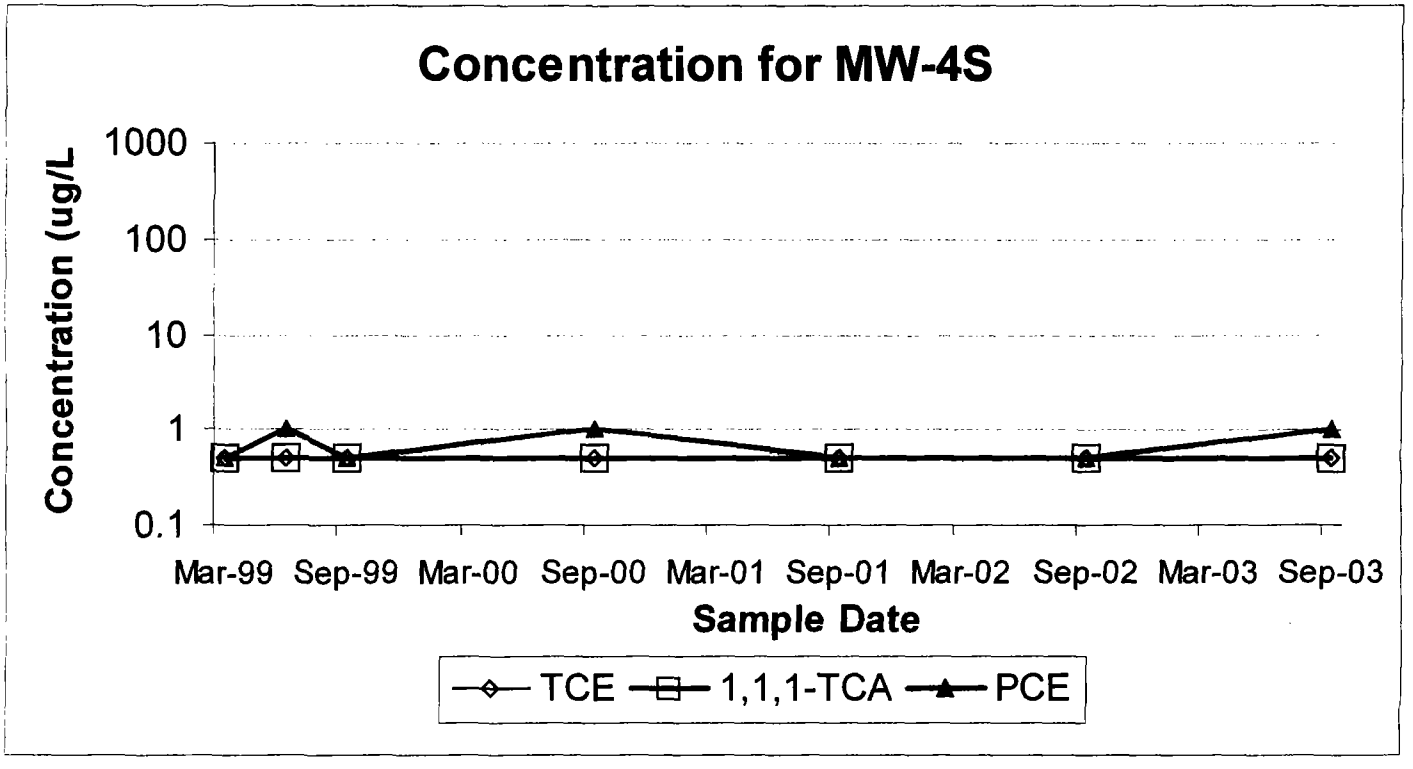
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



Non detect assigned a value of '0.5' and represented by hollow markers e.g. △

Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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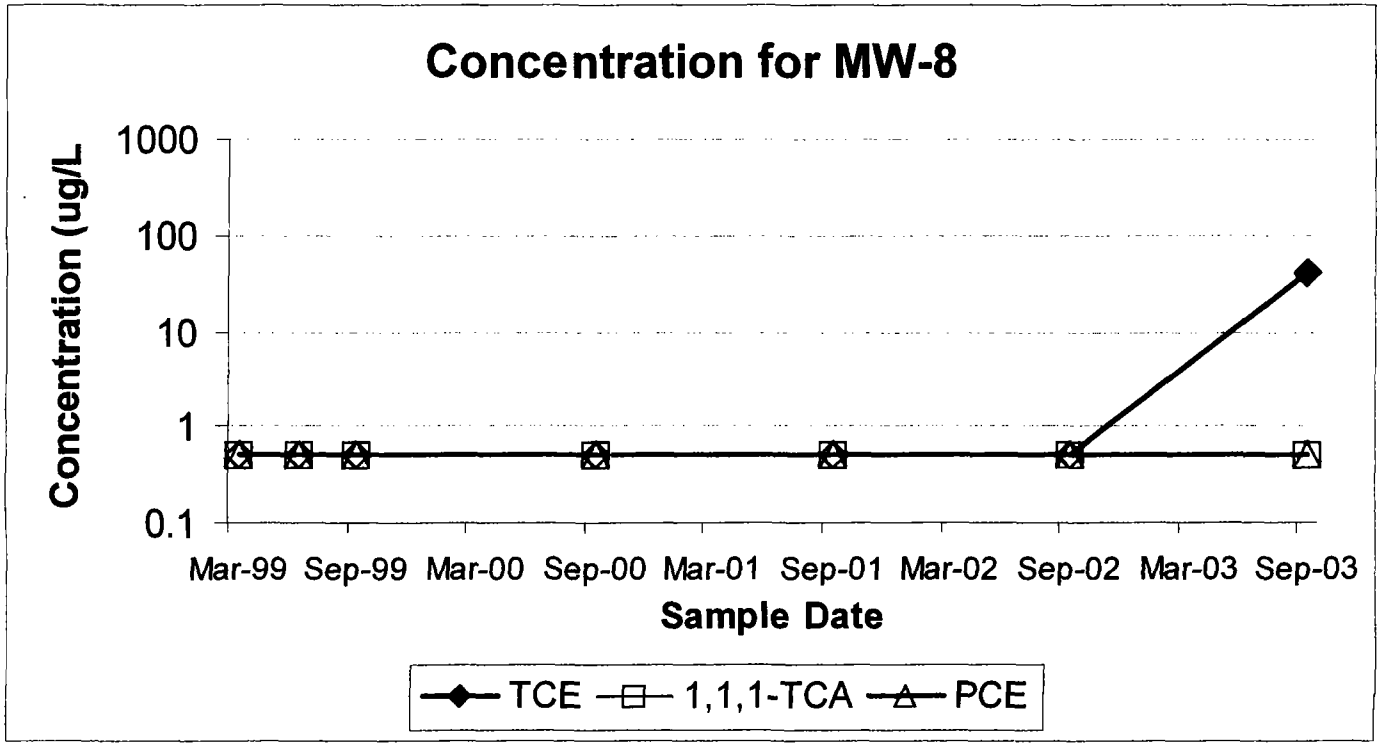
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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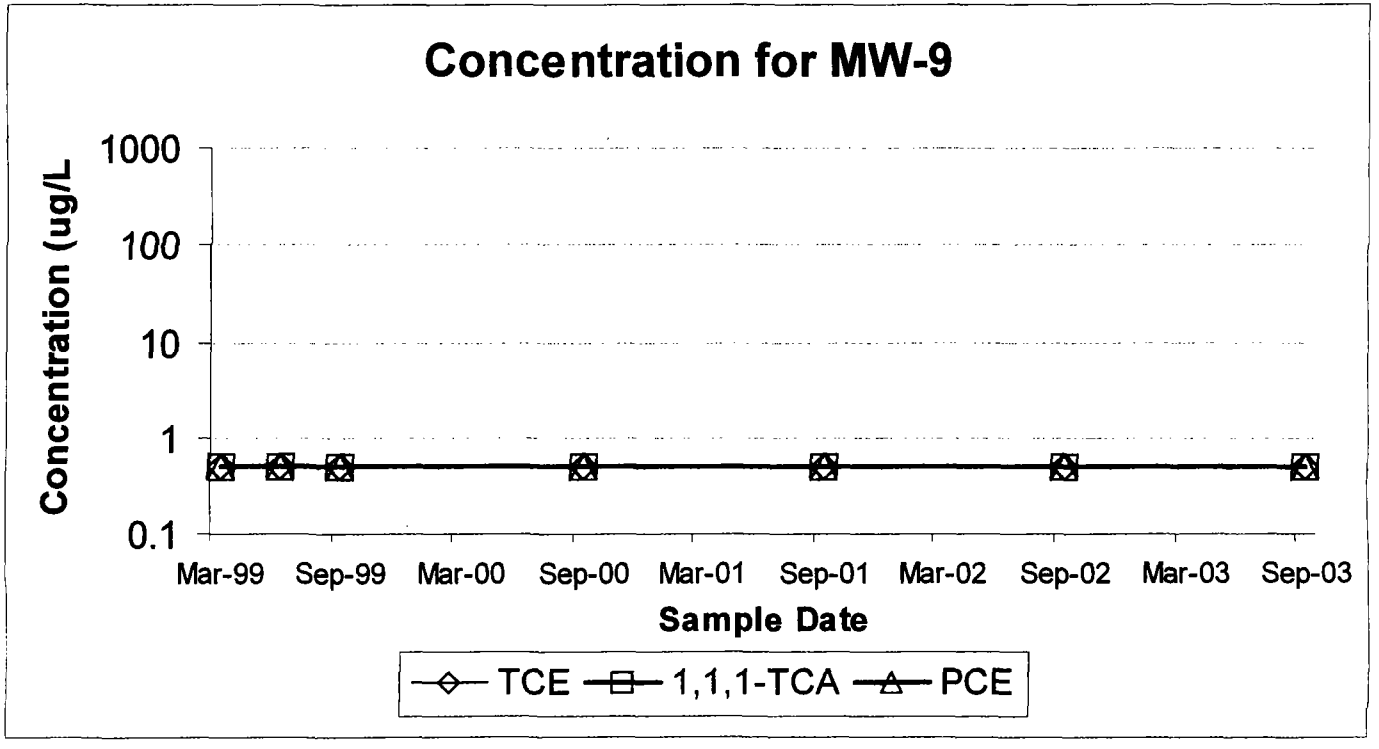
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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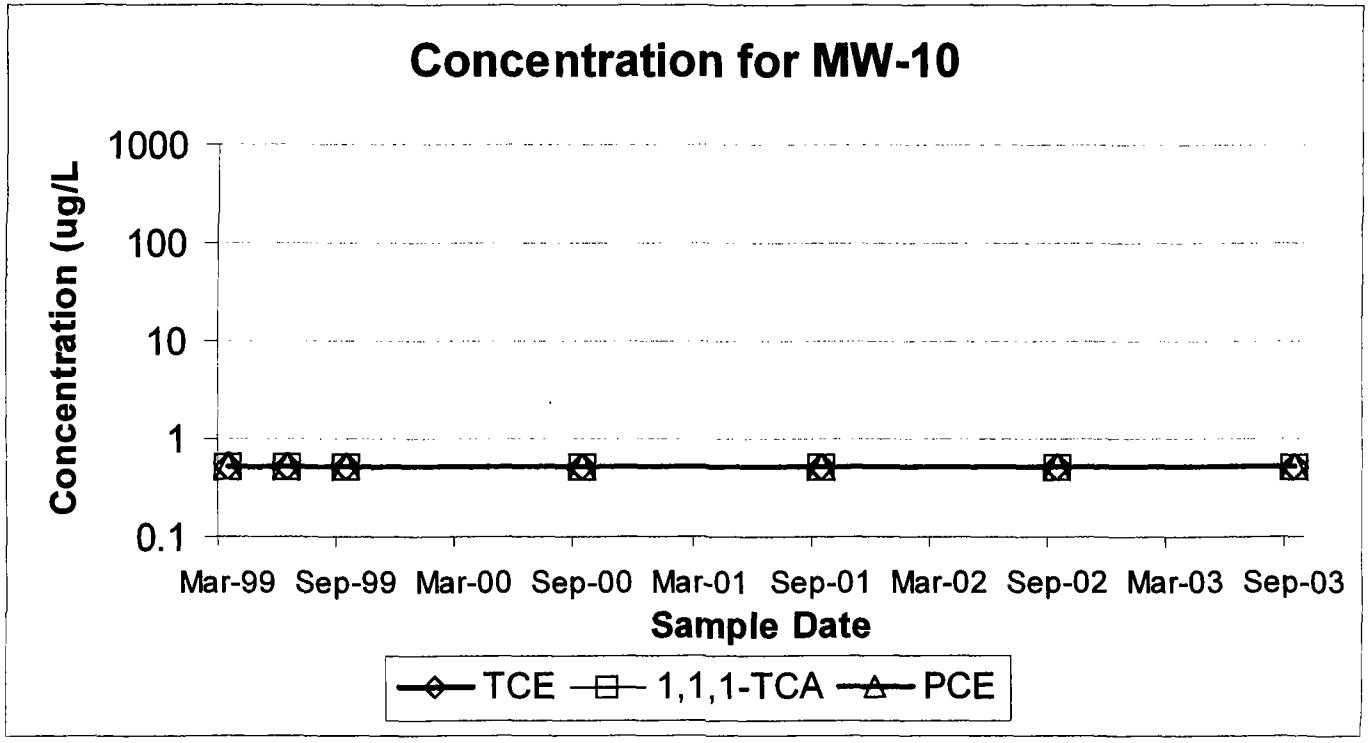
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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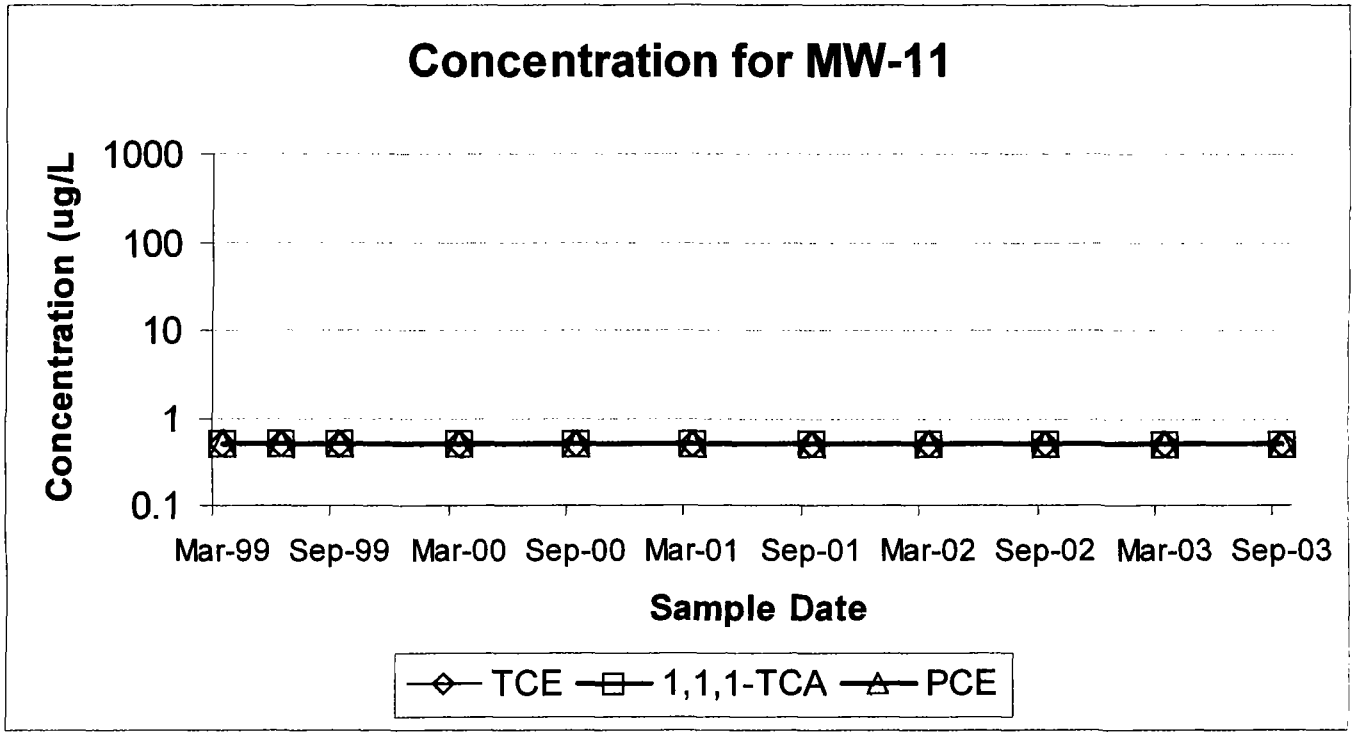
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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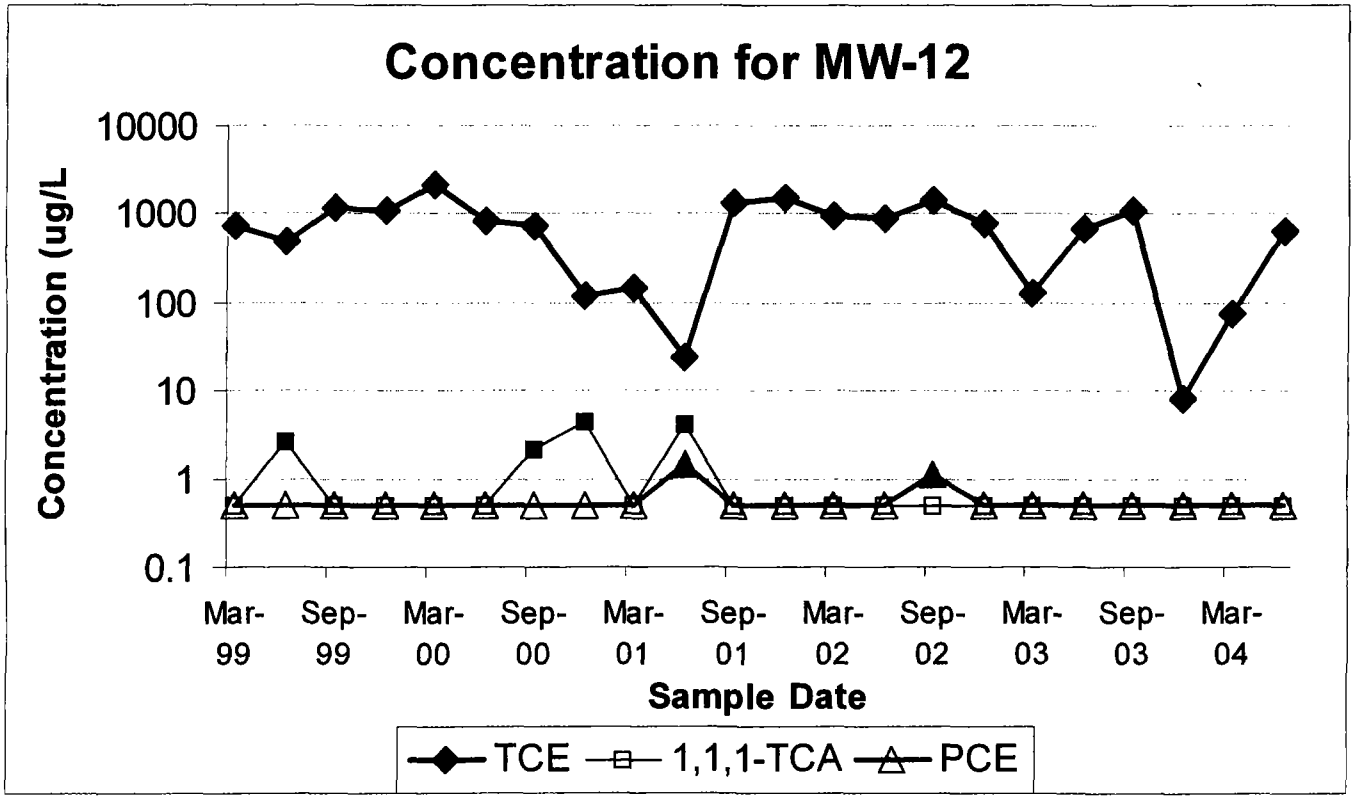
Groundwater Contaminants Concentration vs. Time



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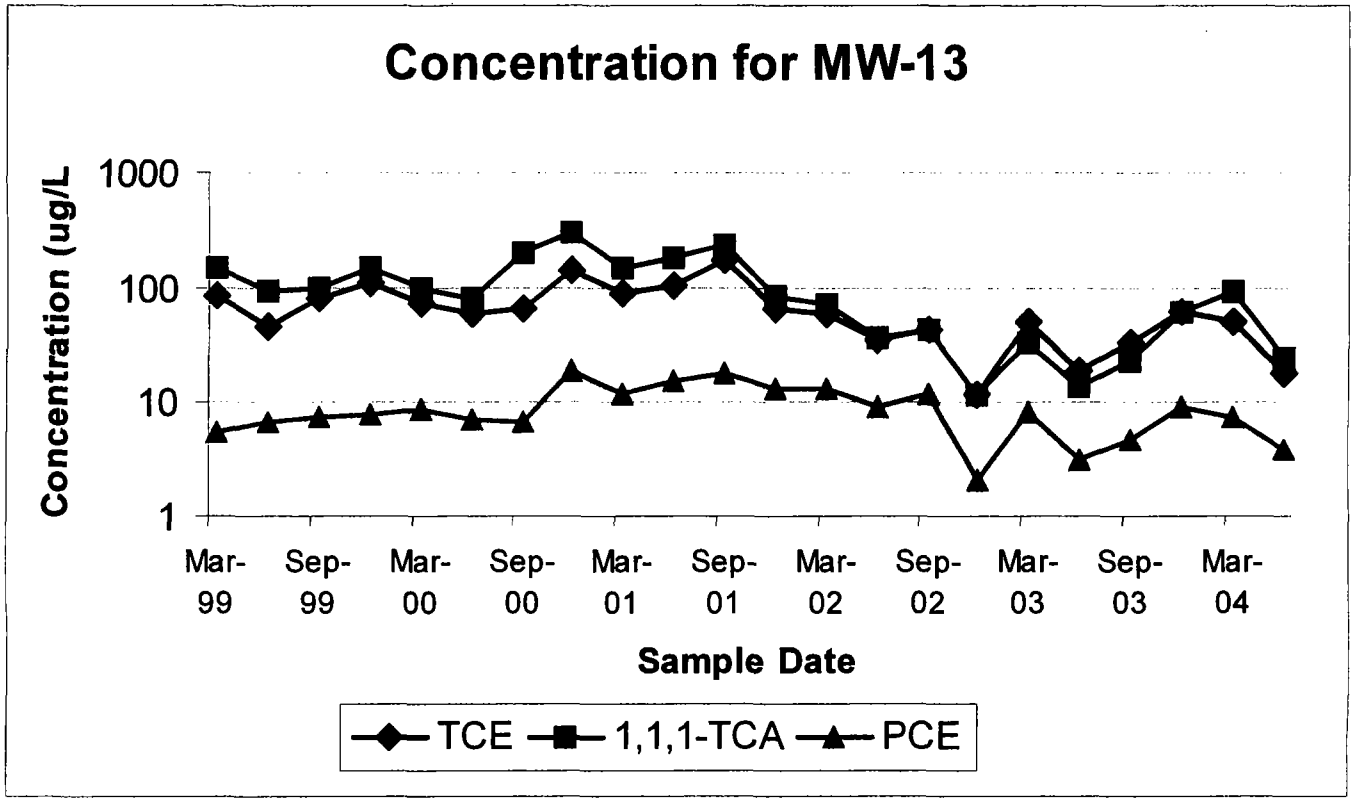
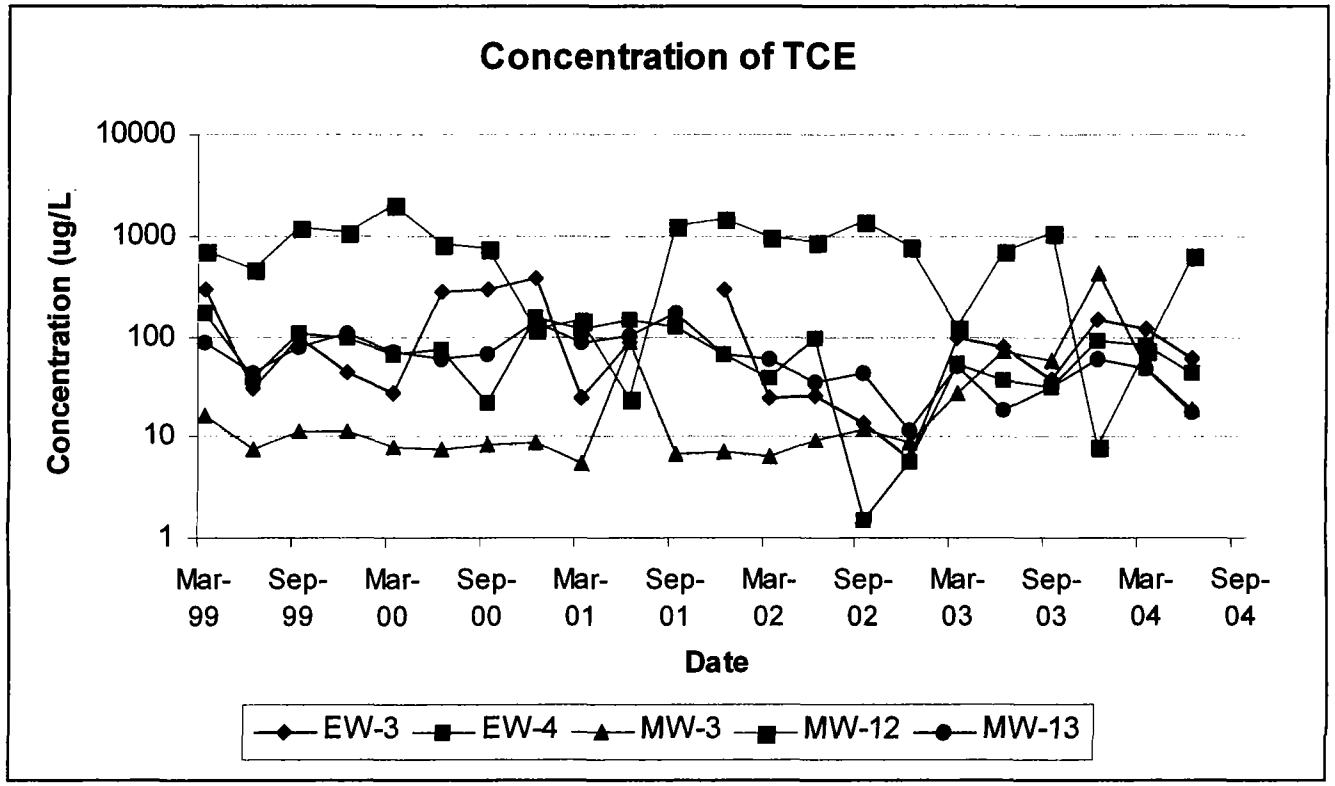
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time

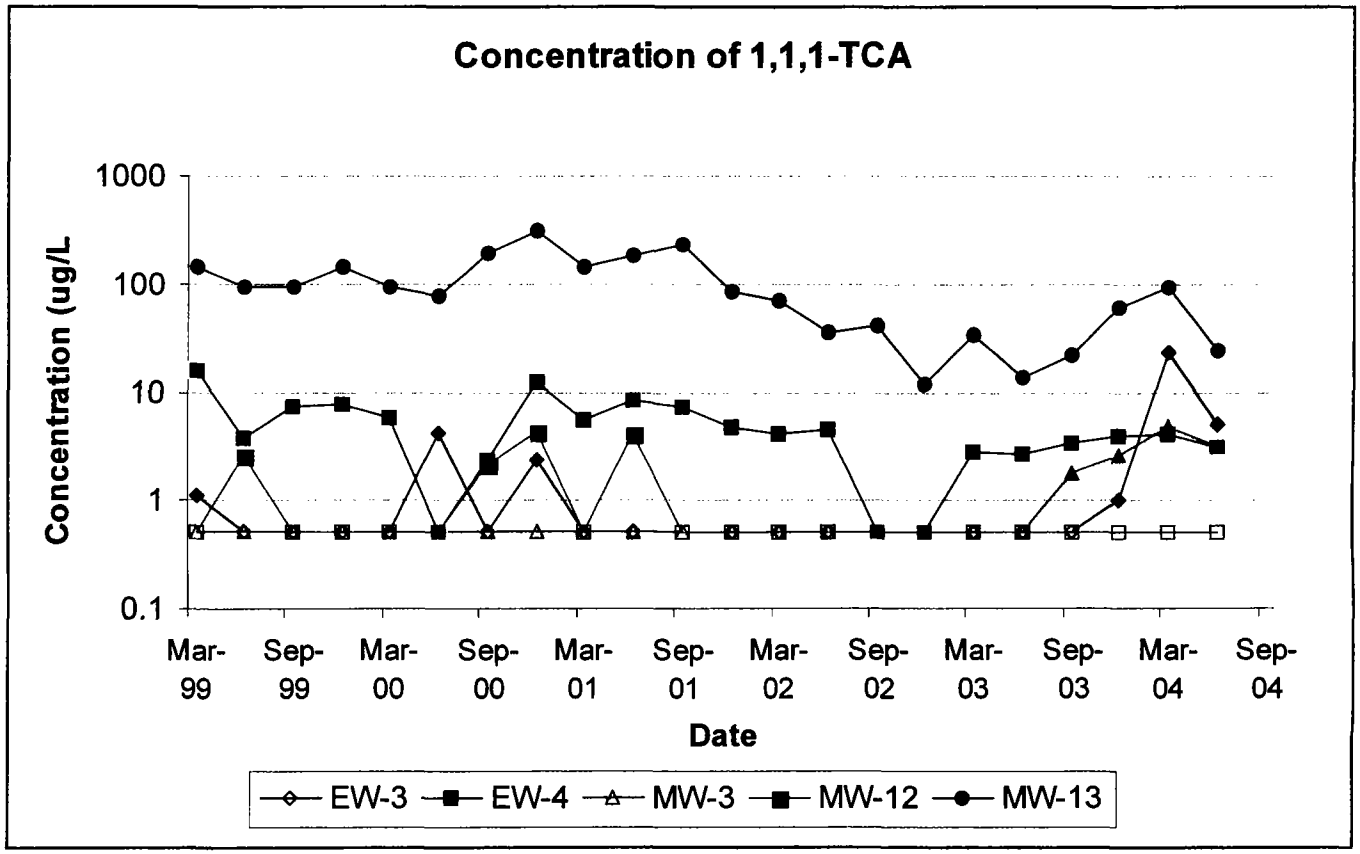


Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



AH. 5B

Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



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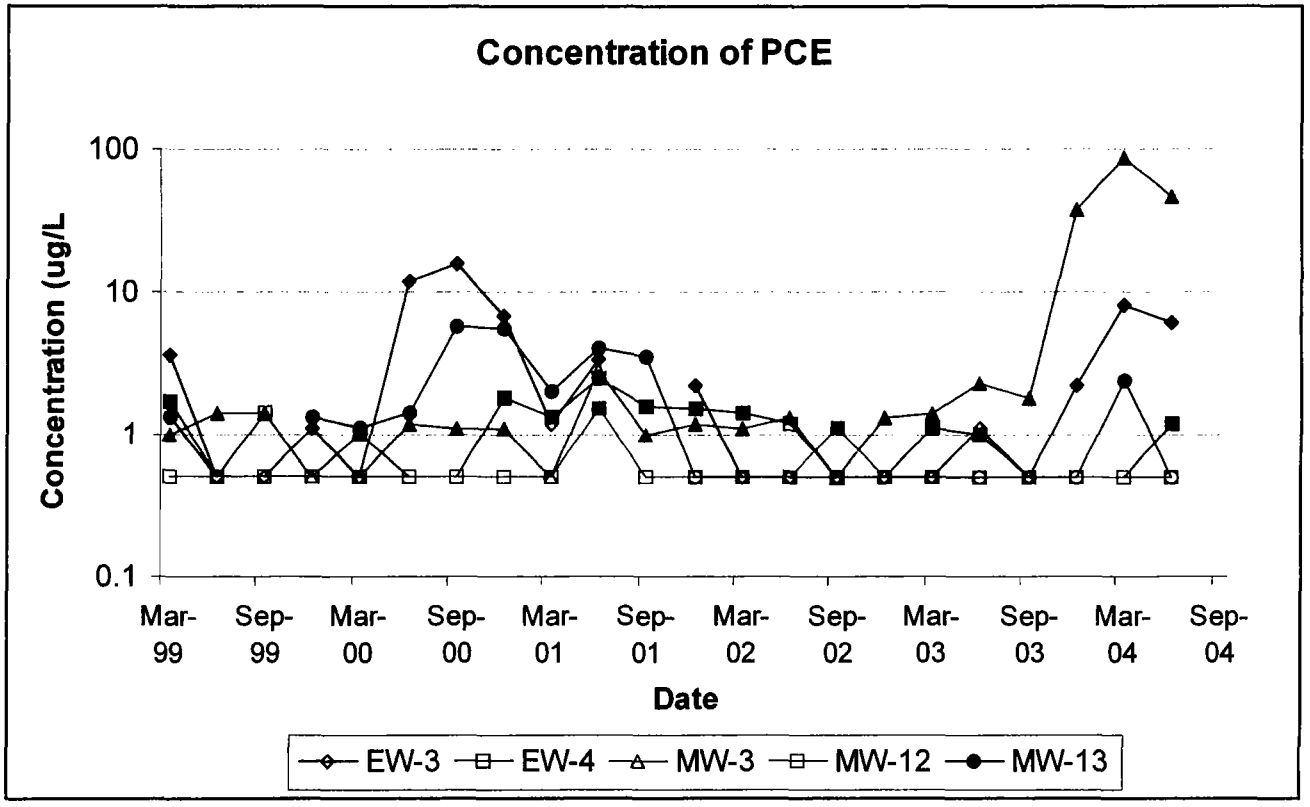
Hedblum Industries Site, AuSable, Michigan
Groundwater Contaminants Concentration vs. Time



Non detect assigned a value of '0.5' and represented by hollow markers e.g. △

MONTHLY OBSERVATION SUMMARY TABLE

Hedblum Industries
Oscoda, Michigan
June, 2004

	Quantity of Loading			Quality or Concentration					Required	
	Monthly Average	Daily Maximum	Units	Daily Minimum	Monthly Average	Daily Maximum	Units	Date of Sample	Frequency of Analysis	Sample Type
Influent Monitoring										
Trichloroethylene	-	-	-	-	-	**40**	ug/l	6/24/04	Monthly	Grab
1,1,I - Trichloroethane	-	-	-	-	-	**2.4**	ug/l	6/24/04	Monthly	Grab
Intermediate Stage Monitoring and Reporting										
Trichloroethylene (after 1st tank in system)	-	-	-	-	-	**25**	ug/l	6/24/04	Monthly	Grab
1,1,1 - Trichloroethane (after 1st tank in system)	-	-	-	-	-	**3.3**	ug/l	6/24/04	Monthly	Grab
Trichloroethylene (after 2nd tank in system)	-	-	-	-	-	**2.3**	ug/l	6/24/04	Monthly	Grab
1,1,1 - Trichloroethane (after 2nd tank in system)	-	-	-	-	-	**4.8**	ug/l	6/24/04	Monthly	Grab
Discharge Limitations, Monitoring and Reporting										
Flow	0.058505	0.166714	MGD	-					Daily	1.170100
Purgeable Halocarbons (Method 8260, approved equivalent of 601/602)	-	-	-	-	-	**ND**	ug/l	6/24/04	Monthly	Grab
Purgeable Aromatics (Method 8260, approved equivalent of 601/602)	-	-	-	-	-	**ND**	ug/l	6/24/04	Monthly	Grab
Equipment Inspection	ok	-	-	-	-	-	-	6/4/04	Weekly	visual
	ok	-	-	-	-	-	-	6/8/04	Weekly	visual
	ok	-	-	-	-	-	-	6/17/04	Weekly	visual
	ok	-	-	-	-	-	-	6/24/04	Weekly	visual
Outfall Observation	ok	-	-	-	-	-	-	6/4/04	Weekly	visual
	ok	-	-	-	-	-	-	6/8/04	Weekly	visual
	ok	-	-	-	-	-	-	6/17/04	Weekly	visual
	ok	-	-	-	-	-	-	6/24/04	Weekly	visual
pH	-	-	-	{6.5}	7.7	{9.0}	S.U.	6/24/04	Monthly	Grab

ND= Not detected (detection limit 1 ug/L)
MGD= Millions of gallons per day
S.U.= Scientific Units
(1)= Reported Total Daily Flow between 6/4/04 and 6/24/04.
ok= (equipment) an "ok" status for the equipment observation indicates that all four wells are operating and the system is running normally, otherwise, any problems with the system are noted below.
ok= (outfall) an "ok" status for the outfall indicates that the recieving stream does not contain any unnatural turbidity, color, oil, film, floating solids, foam, settleable solids or deposits as a result of the discharge.

ATTACHMENT 6

HEDBLUM INDUSTRIES SUPERFUND SITE

Treatment System Discharge (ug/L)

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	220	[illegible]	[illegible]	220	[illegible]	220	250	270	[illegible]	[illegible]	[illegible]	470	150
	INTERMEDIATE	1.2	11	61	[illegible]	[illegible]	.7	90	90	100	2.3	4100	170	53
	EFFLUENT	<1	<1	8.3b	5	2	2	2	2	21	<0.5	1	7	<1
TCA	INFLUENT	12	<10	22	[illegible]	[illegible]	20	33	40	30	1.5	13	20	3
	INTERMEDIATE	<1	1.8	[illegible]	8	14	25	30	20	20	12	2300	25	14
	EFFLUENT	<1	<1	1.3	6	<1	1	8	10	17	<0.5	7	16	<1

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	[illegible]	2	21	37	13	35	170	[illegible]	[illegible]	[illegible]	[illegible]	11	[illegible]
	after 1st tank**	60	78	<1	4	<1	<1	<1	<1	<1	22	130	53	130
	after 2nd tank**	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1
	EFFLUENT	<1	6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TCA	INFLUENT	44	4	3	3	3	<1	<1	2	<1	<1	<1	<1	<1
	after 1st tank**	18	18	2	3	21	<1	<1	4	3	<1	<1	<1	<1
	after 2nd tank**	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1
	EFFLUENT	<1	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	35	[illegible]	[illegible]	140	24	[illegible]	94	<1
	after 1st tank**	170	4	38	90	120	3	13	22	6	7	4	30	6
	after 2nd tank**	1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
	EFFLUENT	<1	<1	<1	<1	<1	<1	8	16	<1	<1	<1	<1	<1
TCA	INFLUENT	<1	<1	<1	<1	<1	<1	<1	7	<1	<1	<1	<1	<1
	after 1st tank**	<1	<1	4	4	<1	<1	<1	<1	<1	<1	<1	<1	<1
	after 2nd tank**	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1
	EFFLUENT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	18	25	16	8	11	7.8	7.3	120	100	62	200	170	47
	after 1st tank**	4	7.6	4.9	4.1	3.3	2.7	2.5	30	35	14	30	42	44
	after 2nd tank**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EFFLUENT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TCA	INFLUENT	<1	<1	<1	<1	<1	<1	<1	2.2	<1	1.6	4.9	6	<1
	after 1st tank**	<1	<1	<1	<1	<1	<1	<1	1.9	1.6	1.4	2.7	2.8	3
	after 2nd tank**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EFFLUENT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	170	130	120	170	220	110	130	70	30	[illegible]	120	95	120
	after 1st tank**	130	130	170	130	3	3.3	3.5	4	2.3	2.9	7.9	3.2	3.7
	after 2nd tank**	<1	<1	<1	1.3	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EFFLUENT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TCA	INFLUENT	1.6	1.3	<1	4.3	4.4	7.7	4.6	3.1	<1	2	1.7	<1	3
	after 1st tank**	1.1	1	2.3	4.6	1.7	1.7	1.8	1.3	1.1	1	<1	1.1	1.3
	after 2nd tank**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EFFLUENT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	69	77	35	39	14	68	140	120	110	230	230	130	62
	after 1st tank**	1.6	3.8	4.2	1.1	4.3	11	72	38	40	62	11	27	25
	after 2nd tank**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EFFLUENT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TCA	INFLUENT	2.7	2.3	1.7	1.3	2.7	4	8.3	8	12	8.3	4	3.2	4.8
	after 1st tank**	1.8	1.7	1.4	<1	2	2.3	3.4	4.7	3.7	4.2	2.3	2.7	3.6
	after 2nd tank**	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1
	EFFLUENT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	1.7	53	44	91	110	98.9	120	34.8	38	35	24	80	38
	after 1st tank**	30	8.2	7.3	8.3	24	14.2	23	44.2	13	13	3.4	12	9.3
	after 2nd tank**	1.4	1.2	3.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCA	INFLUENT	ND	2.8	2	4.6	ND	3.4	9.1	3.7	2.8	1.7	1.3	1.3	1.6
	after 1st tank**	1.3	1.3	ND	1.8	4.2	14.2	4.7	3.6	2.3	2.2	1.4	1.5	1.9
	after 2nd tank**	1.2	1.3	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	21	18	12	77	41	39	14	14	18	16	3.8	33	79
	after 1st tank**	3.3	7.1	1.4	ND	ND	ND	ND	ND	ND	ND	1.3	2.8	8
	after 2nd tank**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCA	INFLUENT	ND	1.3	ND	ND	2	2	ND	ND	ND	ND	ND	ND	1.1
	after 1st tank**	1.6	1.4	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1
	after 2nd tank**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TCE	INFLUENT	[illegible]	[illegible]	48	88	38	41	38	33	38	79	67	66	68
	after 1st tank**	13	8.3	13	16	8.7	7.2	7.4	7.2	13	28	43	48	32
	after 2nd tank**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	4.8	13
	EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCA	INFLUENT	ND	ND	ND	1.1	ND	ND	ND	ND	2.7	1.3	1.9	2.7	7
	after 1st tank**	1.2	1.3	ND	ND	ND	ND	ND	ND	2.4	2.4	2	2.6	7
	after 2nd tank**	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	1.6	2	3.2
	EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6

TCE= Trichloroethylene

TCA= 1,1,1-Trichloroethane

b= Estimated value

ND= Not detected

* Please note that the system was inoperative during portions of March, April, and July, 1993, consequently there is no lab data for those months.

** A third carbon tank was added to the system 1/31/94. Samples taken prior to 1/31 were taken prior to the 1st tank (influent), after the 1st tank and after the 2nd tank (effluent). Samples taken after 1/31 were taken prior to the 1st tank (influent), after the 1st tank, after the 2nd tank and after the 3rd tank (effluent).

HEDBLUM INDUSTRIES SUPERFUND SITE
Treatment System Discharge (ug/L)

	Sample Date	4/21/94	5/18/94											
TCE	INFLUENT	41	39	40										
	after 1st tank**	20	28	23										
	after 2nd tank**	1	1.6	2.3										
	EFFLUENT	ND	ND	ND										
TCA	INFLUENT	1.4	8.2	2.4										
	after 1st tank**	3.1	7.4	3.3										
	after 2nd tank**	2.7	3.1	4.8										
	EFFLUENT	ND	ND	ND										

	Sample Date													
TCE	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													
TCA	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													

	Sample Date													
TCE	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													
TCA	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													

	Sample Date													
TCE	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													
TCA	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													

	Sample Date													
TCE	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													
TCA	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													

	Sample Date													
TCE	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													
TCA	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													

	Sample Date													
TCE	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													
TCA	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													

	Sample Date													
TCE	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													
TCA	INFLUENT													
	after 1st tank**													
	after 2nd tank**													
	EFFLUENT													

TCE= Trichloroethylene
TCA= 1,1,1-Trichloroethane
b= Estimated value
ND= Not detected
** A third carbon tank was added to the system 1/31/96. Samples taken prior to 1/31 were taken prior to the 1st tank (influent), after the 1st tank and after the 2nd tank (effluent). Samples taken after 1/31 were taken prior to the 1st tank (influent), after the 1st tank, after the 2nd tank and after the 3rd tank (effluent).

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

I. SITE INFORMATION

Site name: Hedblom Industries	**Date of inspection:** July 21, 2004
Location and Region: Au Sable Township Iosco Co., MI	**EPA ID:** MID980794408
Agency, office, or company leading the five-year review: U.S.EPA	**Weather/temperature:** Hot, 80 °F, Sunny, slightly humid

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Andrew Girard (Name) Geologist (Title) 7/21/04 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

Inspection Participants

Cindy Fairbanks, MDEQ, Project Mgr.
Matthew Baltusis, MDEQ, Geologist
Robert Reisner, MDEQ, Unit Chief, Superfund
Sheila Sullivan, RPM, USEPA, Superfund
Andrew Girard, Geologist, Global Engineering
William Korreck, President, Global
Thomas Hoban, Legal, SPX Corporation
Daniel McBride, Director, ENV H+S, SPX Corporation

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency / Contact (Name)	Title	Date	Phone no.
Au Sable Township Water Cal Taylor	Superintendent	7/22/04	989-820-5754

Problems; suggestions; ☐ Report attached _____

Agency / Contact (Name)	Title	Date	Phone no.
Au Sable Township Ronald Gaskell	Zoning Administrator	7/22/04	989-739-9169

Problems; suggestions; ☐ Report attached _____

Agency / Contact (Name)	Title	Date	Phone no.
Oscoda City Clerks Dine Manderachio	City Clerk	7/22/04	989-739-4811

Problems; suggestions; ☐ Report attached _____

Agency / Contact (Name)	Title	Date	Phone no.
Au Sable Township Della Schwaickart	Clerk	7/22/04	989-739-9169

Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Report attached.

Mr. Desmond Lynch, President, Aircraft Tool Supply
Mr. Jude Williams, resident, Au Sable Heights
Andrew Girard, Global Environmental Engineering

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks O+M Manual needs to be updated; Information Kept at Elk Rapids, MI office.

2. **O&M Cost Records**
☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☒ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A
Remarks No fencing on Site

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A
Remarks No signs or security measures to property. ATS company facility on site has security system.

C. Institutional Controls (ICs)

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A
Remarks

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A
Remarks Records maintained by Global Environmental Engineering in the Elk Rapids, MI office

4. **Permits and Service Agreements**
☐ Air discharge permit ☐ Readily available ☐ Up to date ☒ N/A
☒ Effluent discharge ☒ Readily available ☒ Up to date ☐ N/A
☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☒ N/A
☐ Other permits None ☐ Readily available ☐ Up to date ☐ N/A
Remarks Copy of SRD for effluent discharge kept by Global

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A
Remarks

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A
Remarks

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A
Remarks

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A
Remarks

9. **Discharge Compliance Records**
☐ Air ☐ Readily available ☐ Up to date ☐ N/A
☒ Water (effluent) ☐ Readily available ☒ Up to date ☐ N/A
Remarks

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A
Remarks Maintained by Global in Elk Rapids, MI

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☒ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☒ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☒ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____

Frequency _____

Responsible party/agency _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

_____

_____

_____

_____

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☒ N/A

Remarks _____

_____

_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks Trespassing on-sit by adolescents occurs regularly

_____

2. **Land use changes on site** ☒ N/A

Remarks Land zoned industrial

_____

3. **Land use changes off site** ☒ N/A

Remarks _____

_____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks maintained by ATS

_____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent _____ Depth _____
   Remarks _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths _____ Widths _____ Depths _____
   Remarks _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent _____ Depth _____
   Remarks _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent _____ Height _____
   Remarks _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent _____
   ☑ Ponding ☐ Location shown on site map Areal extent _____
   ☐ Seeps ☐ Location shown on site map Areal extent _____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent _____
   Remarks _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks_____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____

2. **Performance Monitoring** Type of monitoring_____
☐ Performance not monitored
Frequency_____ ☐ Evidence of breaching
Head differential_____
Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☒ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks occasional relay needs to be changed out every 2 months or so

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☒ Needs Maintenance on a regular basis due to age of system
Remarks putting together a proposal to upgrade transmitters from version to wireless from pluneline

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☒ Requires upgrade ☐ Needs to be provided
Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks_____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☒ Carbon adsorbers
☒ Filters Iron filter bypassed due to plugging by iron bacteria
☐ Additive (*e.g.*, chelation agent, flocculent) _____
☐ Others _____
☐ Good condition ☐ Needs Maintenance
☒ Sampling ports properly marked and functional
☒ Sampling/maintenance log displayed and up to date → available at Global office
☒ Equipment properly identified
☒ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually _____
Remarks EW-1, 2, 4 pumps and plumbing replaced in 2001. EW-3 pump + plumbing replaced in 2003. EW-2 transmitters + receivers reprogrammed

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☒ Good condition ☒ Needs Maintenance regularly
Remarks Maintenance largely involves replacing transmitters and relays and receivers. Planning to switch to a wireless system so signals transmitted via radio signals and phone lines

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks _____

4. **Discharge Structure and Appurtenances**
☐ N/A ☒ Good condition ☐ Needs Maintenance
Remarks _____

5. **Treatment Building(s)**
☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair
☒ Chemicals and equipment properly stored
Remarks Chemicals not stored on-site

6. **Monitoring Wells** (pump and treatment remedy)
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks _____

D. Monitoring Data

1. Monitoring Data Would like additional data – well capacities
☒ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests: Concentrations overall are slowly declining; no indication as to whether plume is effectively contained
☐ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☒ N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Over the past 5 years, since last Review, the extraction well system appears to be operating closer to design capacity. Total extraction rate today was 105 GPM. The system increase in capacity occurred around Nov 2003 when lines were cleaned. EW-2 was offline for nearly 14 months, which contributed to insufficient rates. The remedy was to extract the groundwater plume within 5 years of operation. Due to low pumping rates from the fouling of iron bacteria and system breakdowns, operation from 1999 - Oct. 2003 was suboptimal. Since the well pumps have been upgraded and the lines cleaned, it is better, but difficult to tell if this will be maintained. It is not possible to determine whether the plume has been contained during the several years of low pumping rates.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The System overall is well maintained and operated, but additional maintenance of the extraction wells and flow lines will be necessary to ensure that adequate extraction rates are maintained. In addition, there is not enough data being supplied to the Agencies to determine plume capture effectiveness. For example, all of the monitoring wells should be used. Also, O+M log sheets and other data from weekly O+M operations should be provided to Agencies.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

O+M costs have not been provided to the Agencies. The electrical controls of the extraction well system are inefficient and outdated - hence contributing to the long down-time of EW-2. The RP is planning to convert to a wireless control and telemetry system which will improve the efficiency of the system. Otherwise, relay switches, fuses, receivers, etc. must be replaced on a continual basis. This conversion is anticipated to begin within 6 months.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

The monitoring system is not sufficient to determine plume capture. More monitoring wells, sentinel wells, and piezometers would need to be installed to track plume movement. There appears to be not enough monitoring points in the correct locations to assess the situation. Further, individual and total extraction rates must be supplied to the Agencies.

Contacts

Charter Township of AuSable
311 Fifth Street
AuSable, Michigan
48750

Office:.....739-9169
Fax:.....739-0696
Water/Sewer:...739-1838

Important Names & Numbers:

Township Board:	Trustees:
Supervisor - Ron Lamrock **Clerk** - Della Schweickert **Treasurer** - Bobbi Kopko	Alanda Barnes Mike Poland Matt Gary Kevin Beliveau
Planning Commission:	**Zoning Board of Appeals:**
Burt Poland - Chairman Alan Mixter Chris Ropp James Coon Janice Baldwin Paul Darner Kevin Beliveau	Buck Derocher - Chairman Burt Poland Steve Moore Rollin Reineck Henry Altman **Alternates:** Frank Salazar Mike Walker
Other Positions:	**Phone Numbers:**
Zoning - Ron Gaskell **Assessing** - Robert Boschma **Office Manager** - Sue Gilliam **Public Works** - Cal Taylor Pat Wagner Sue Gilliam Deb Shellenbarger	Oscoda Police Dept.....911 Non-Emergency.....362-1430 Administrative.....739-9112 County Building Dept.....362-6511 County Health Dept.....362-6183 County Road Commission....362-4433 County Burn Permits.....362-5649

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OSCODA TOWNSHIP - CONTACT INFORMATION

CHARTER TOWNSHIP OF OSCODA

Robert Huebel III, Supervisor
Jaimie McGuire, Treasurer
Diane Manderochio, Clerk
Robert Hodges, Trustee
Stephen Pappas, Trustee
James Baier, Trustee
Matthew Hinckley, Trustee

CHARTER TOWNSHIP OF OSCODA STAFF

Robert F. Stalker II, Superintendent - 989-739-8299
Merry Hart, Executive Secretary - 989-739-3211

Gary Kellan, Economic Development Coordinator 989-739-6999
Debbie Franks, Administrative Secretary

Jaimie McGuire, Treasurer - 989-739-7471
Lois Sawielski, Deputy Treasurer

Diane Manderochio, Clerk - 989-739-4971
Judy Johnson, Deputy Clerk
Sharon Dowd, Clerical Assistant

Nancy Schwickert, Assessor - 989-739-7071
Heather Weekes, Appraiser
Helen Dix, Description Clerk

Chris Carrasco, Utility Billing Clerk - 989-739-7532

Robert LaVack, Chief of Police - 989-739-9113
911- Emergencies
Sherry Lee, Secretary - 989-739-9113
Misty Krammerer, Typist

Allan MacGregor, Fire Chief - 989-739-9113

Larry Schneider, Manager Old Orchard Park - 989-739-7814
Oscoda Community Center -989-739-2251
Stephen Soper, Maintenance
Lucy Lankford, Secretary

Jim Biggar, Zoning Administrator - 989-739-9019

Jim Biggar, Zoning Administrator - 989-739-9619

William Hamlin, Foreman - 989-739-9778
Alan Strickland
Chris Kitchen
Kevin Smith
Ken Kahilia

Diana London, Library Director - 989-739-9581
Rita Bennett, Assistant
Katie Montgomery, Assistant
Marilyn White, Assistant

ATTACHMENT 9

Hedblum Industries Superfund Site
Au Sable Township
Iosco County Michigan

Photograph Log From Five-Year Review

Site Inspections:

May 18, 2004
July 20-21, 2004

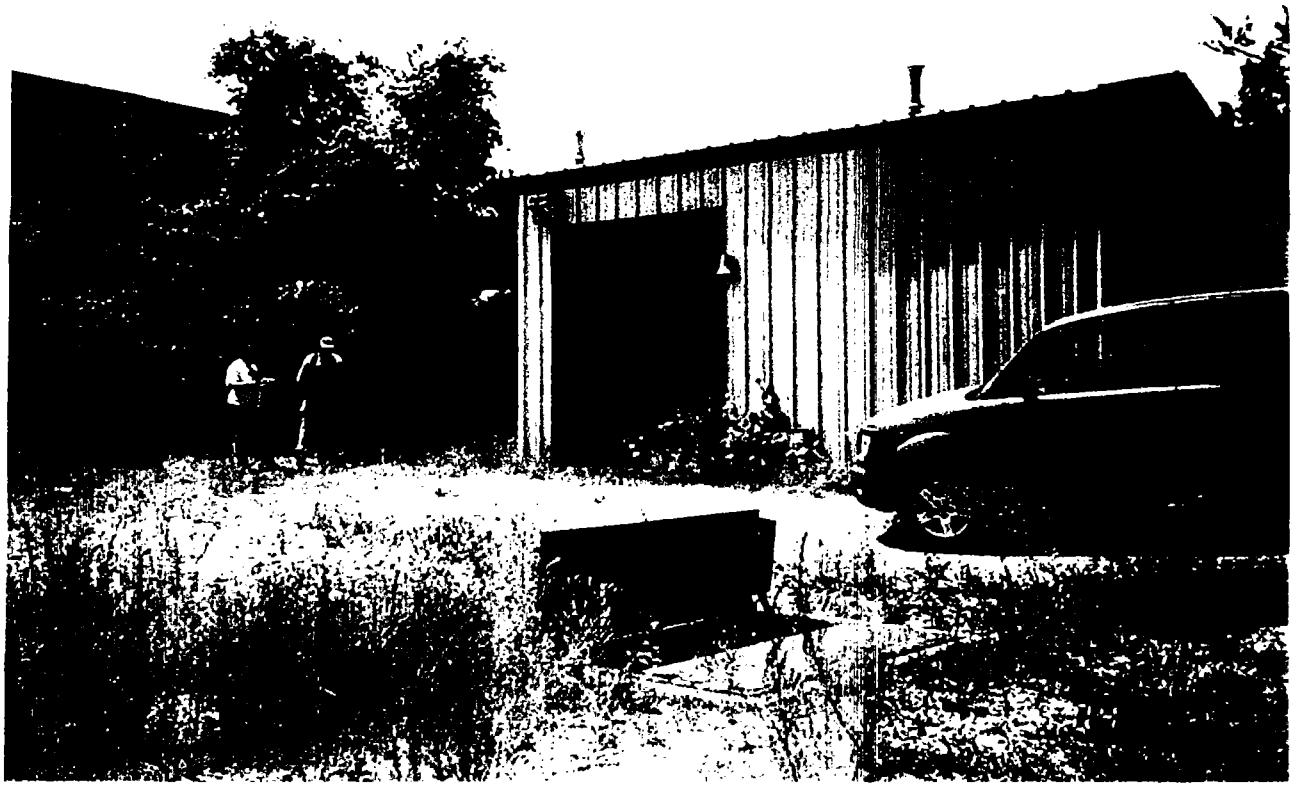


Figure 1: From East: GAC treatment plant building at north end of Aircraft Tool Supply (ATS) building. Extraction well 3 (EW -3) is in the foreground with vault door open.

Figure 2. From Southwest: Aircraft Tool Supply (ATS) facility on 10-acre parcel, located at 1000 Au Sable Road.

Figure 3. Looking Northwest: The southeast side of ATS building with Monitoring Wells MH 1S (left) and MH 1D (right) in foreground.

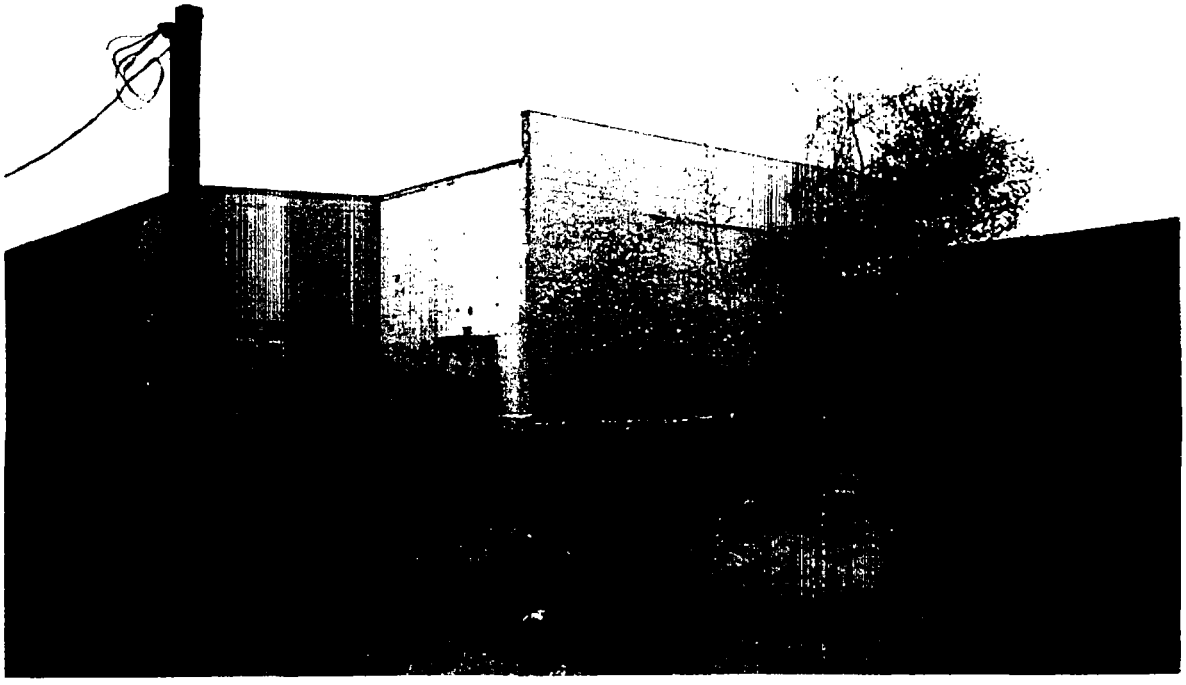


Figure 4. From Northeast: Rear of ATS building where loading dock area was located. The GAC treatment building (not visible) is located just to the right.

Figure 5. From the southeast entrance of the treatment building: Inside GAC treatment building. GAC tanks A, B, and C are visible.

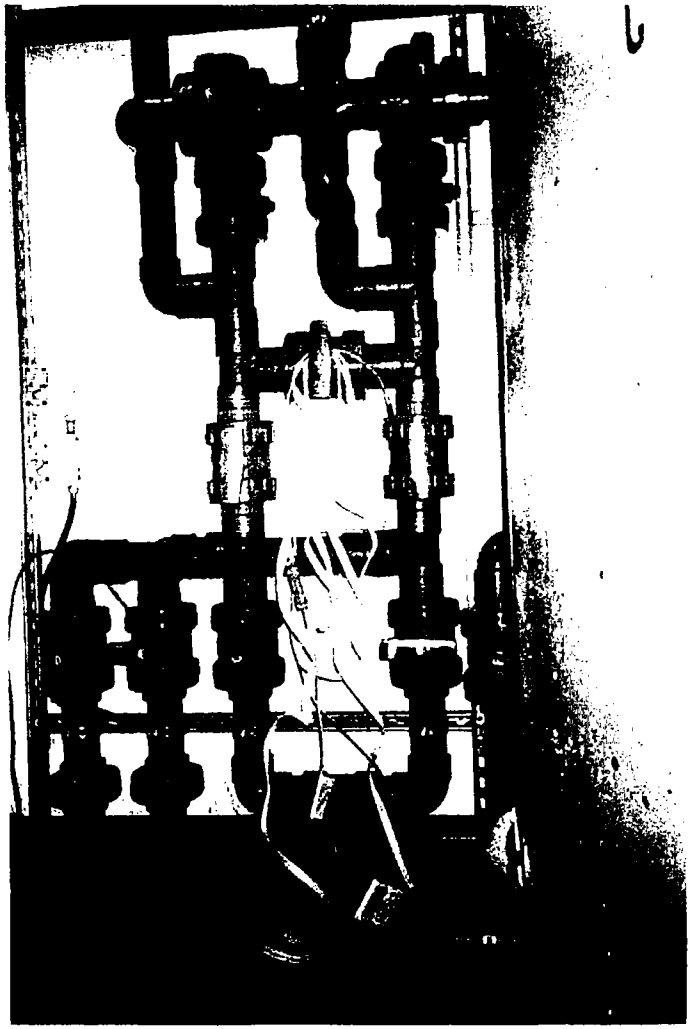


Figure 5. Flow Valves Inside the treatment building and influent/effluent piping.

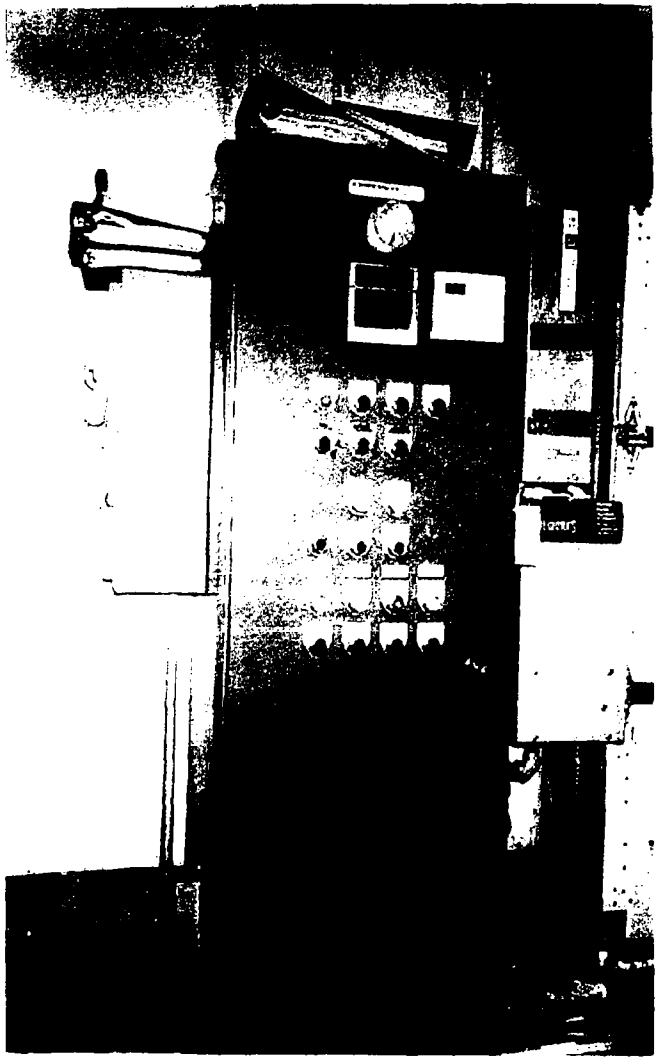


Figure 7. Inside GAC treatment building: electrical panel controlling automatic shut-down of extraction wells and annunciator system.

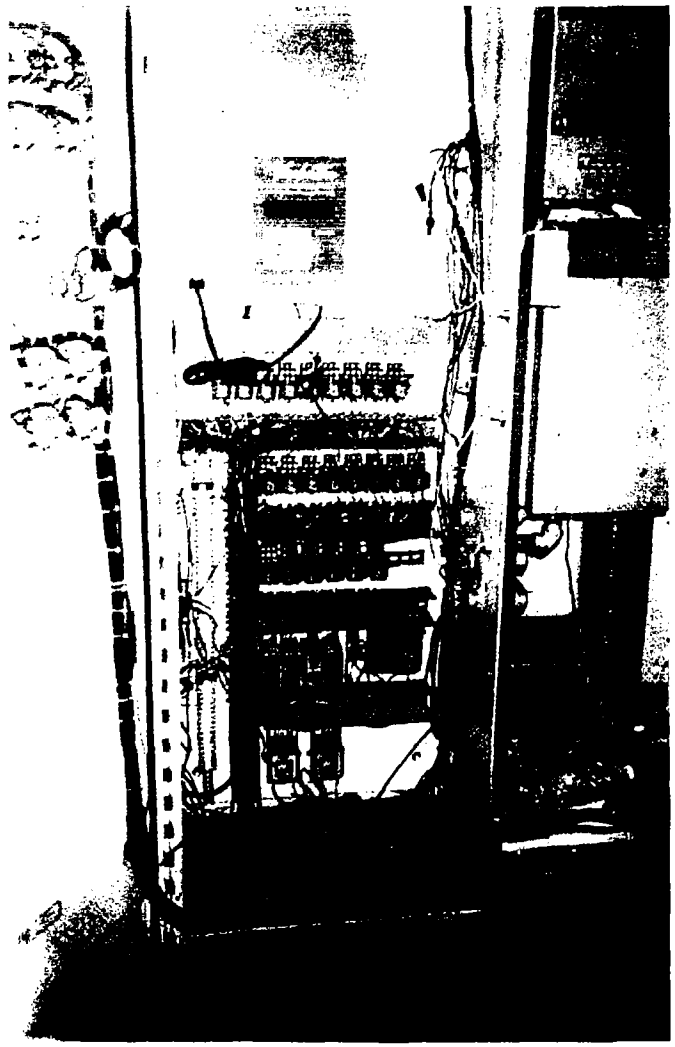


Figure 8. Inside view of the electrical panel.

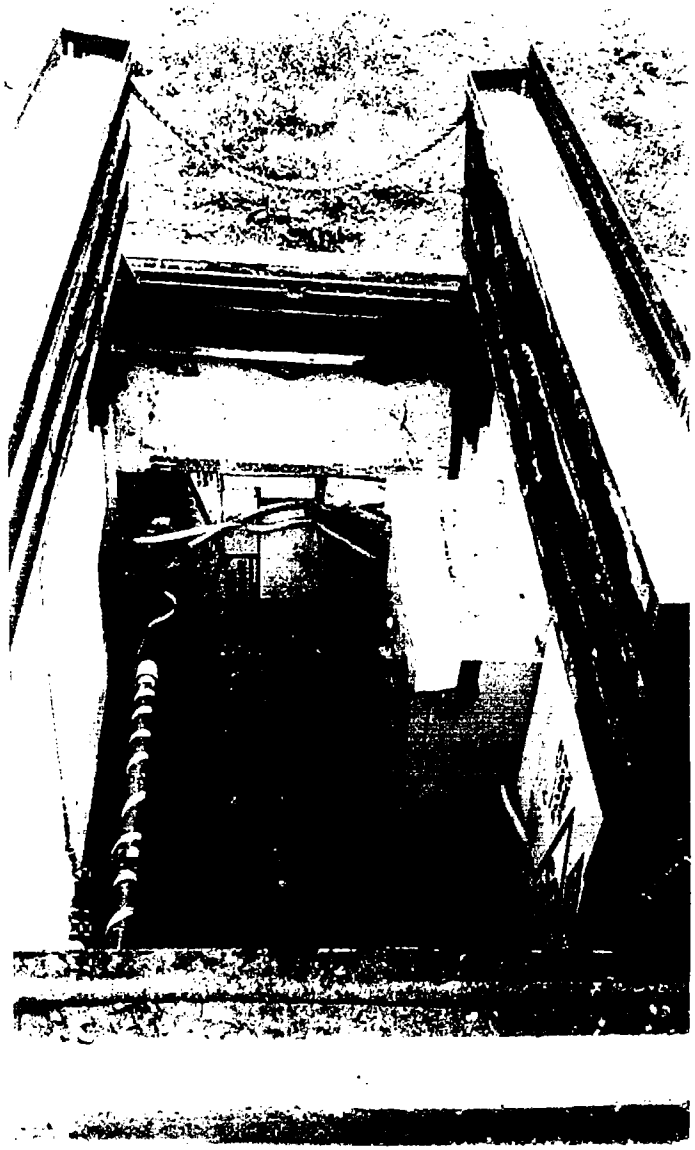


Figure 9. View inside the vault of EW-4. The 4 inch line to GAC treatment building is visible.

Figure 10. Looking East toward Detroit and Mackinac Railroad tracks. View of Monitoring wells MW-8 and MW-9. Extraction Well EW-3 (not visible) is just to the right.

Figure 11. Looking East: Monitoring wells (MW) 5S and 5D, about 100 feet east of Franklin Street

Figure 12. Looking North: Vault (closed) for extraction well 2 (EW-2), directly northeast of Franklin Street.

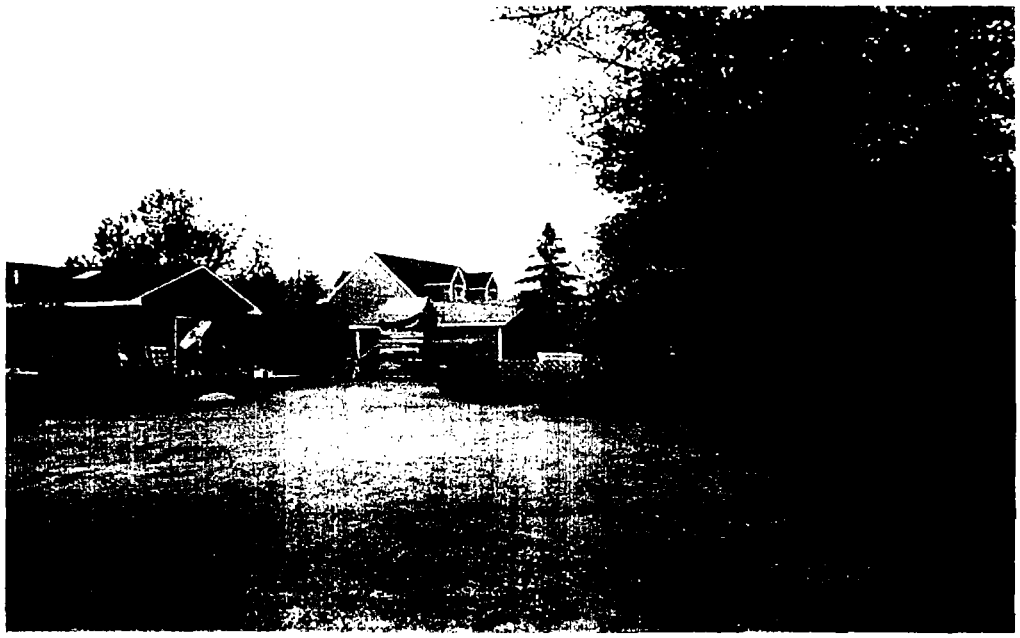


Figure 13. Looking Northeast: Monitoring well MW-14 just outside dog pen, and MW-15 inside pen and just north of MW-14. The cross-hatched fence in deep mid-ground is the dog pen.

Figure 14. Looking North: Discharge area of Au Sable Bayou or Dead Au Sable River. Some refuse is visible in the foreground.

Figure 15. Looking Southwest: Treatment system effluent discharge pipe. The pipe is located about 250 feet southeast of MWs-14 and 15.

Figure 16. Looking Northwest: Extraction well EW-1 vault opened. EW-1 is located on Franklin Street.

Figure 17. Looking Southwest. Extraction well EW-4 Vault (opened) in midground of photo. Monitoring wells MW-12 and MW-13 are located behind and to the right of EW-4 and are marked by the yellow stakes.

Figure 18. Looking West: Monitoring well MW-10 (left) and MW-11 (right) are located immediately behind the mid-ground fenced area.

Figure 19. Looking South. Monitoring wells MH-4S and MH-4D are in the mid-ground of the photo amongst the trees. The wells are set back about 200 feet form the corner of Franklin Street and Sunset Road.

Figure 20. Looking East: Monitoring well MH-2S is in the lower left-hand corner of the photo. MW-18 is in the mid-ground of the photo and marked by the yellow stakes.

Figure 21. Looking Northwest: Monitoring wells MH-3D (left) and MH-3S (right).

Figure 22. Looking Northwest. At the intersection of the Detroit Mackinac Railroad tracks and Au Sable Road (Old U.S. 23). The ATS facility is the large gray building in the background.

Figure 23. Looking Southeast: From Sunset Road looking toward industrial park. ITT Industries is in the background on the right side. The Huron Shore Regional Water Utility (HSRWU) tank is visible in the background.

Figure 24. View of the Dead Au Sable River from Sunset Road.

Figure 25. View of Dead Au Sable River from Sunset Road. Canoers were seen on the river.

Figure 26. Au Sable River looking north from downtown area. Canoers are visible in the right mid-ground of the photo.

APPENDIX 1

Hedblum Industries Site
1987 Soil Gas Investigation

1.0 INTRODUCTION

The Camp Dresser and McKee (CDM) REM II Team conducted a soil gas survey from January 27 to February 5, 1987, at the Hedblum Industries site in Oscoda, Michigan as part of the Remedial Investigation (RI). Groundwater at the site has been contaminated with trichloroethylene (TCE). The contamination has migrated into an adjacent residential area. Data from the soil gas survey was used to optimize the placement of monitoring wells within the contaminated portion of the aquifer.

A Photovac 10S50 portable gas chromatograph was used to analyze soil gas samples. Due to winter conditions, the analyses were conducted in an on-site trailer where control over temperature could be maintained.

1.1 BACKGROUND

Approximately 4,000 gallons of TCE were reportedly dumped directly on the ground on the northwest side of the Hedblum Industries building between 1968 and 1972. Additionally, contaminated cooling water was discharged to the ground. In 1981, installation and sampling of monitoring wells by the Michigan Department of Natural Resources found TCE contamination at the locations shown in Figure 1. In January, 1987, CDM began RI activities at the site under U.S. EPA Work Assignment No.: 320-5LE9.

1.2 OBJECTIVES

The objectives of the soil gas survey were:

- Locate contaminant source areas on-site; and
- Delineate the contamination both on-site and off-site.

3.0 RESULTS AND DISCUSSION

3.1 ON-SITE AREAS

The soil gas investigations resulted in the delineation of a TCE plume as shown in Figure 5. The source area of highest concentration (68.67 ppm) was found below a former loading dock. High soil-gas concentrations were also evident around the former buried tank location (1-10 ppm). The plume appears to be migrating in an easterly direction (the probable direction of groundwater flow). Data results can be found in Appendix B.

3.2 OFF-SITE RESIDENTIAL AREAS

The soil gas investigation was carried off site to investigate reports of TCE found in residential wells. The locations are shown in Figure 6. Concentrations of TCE were not detected at the 4 foot probe depth. TCE was also not detected when a 10 foot probe was used. The concentration of TCE in the groundwater 500-1200 feet from the suspected source may be too low to be detected in the soil gas.

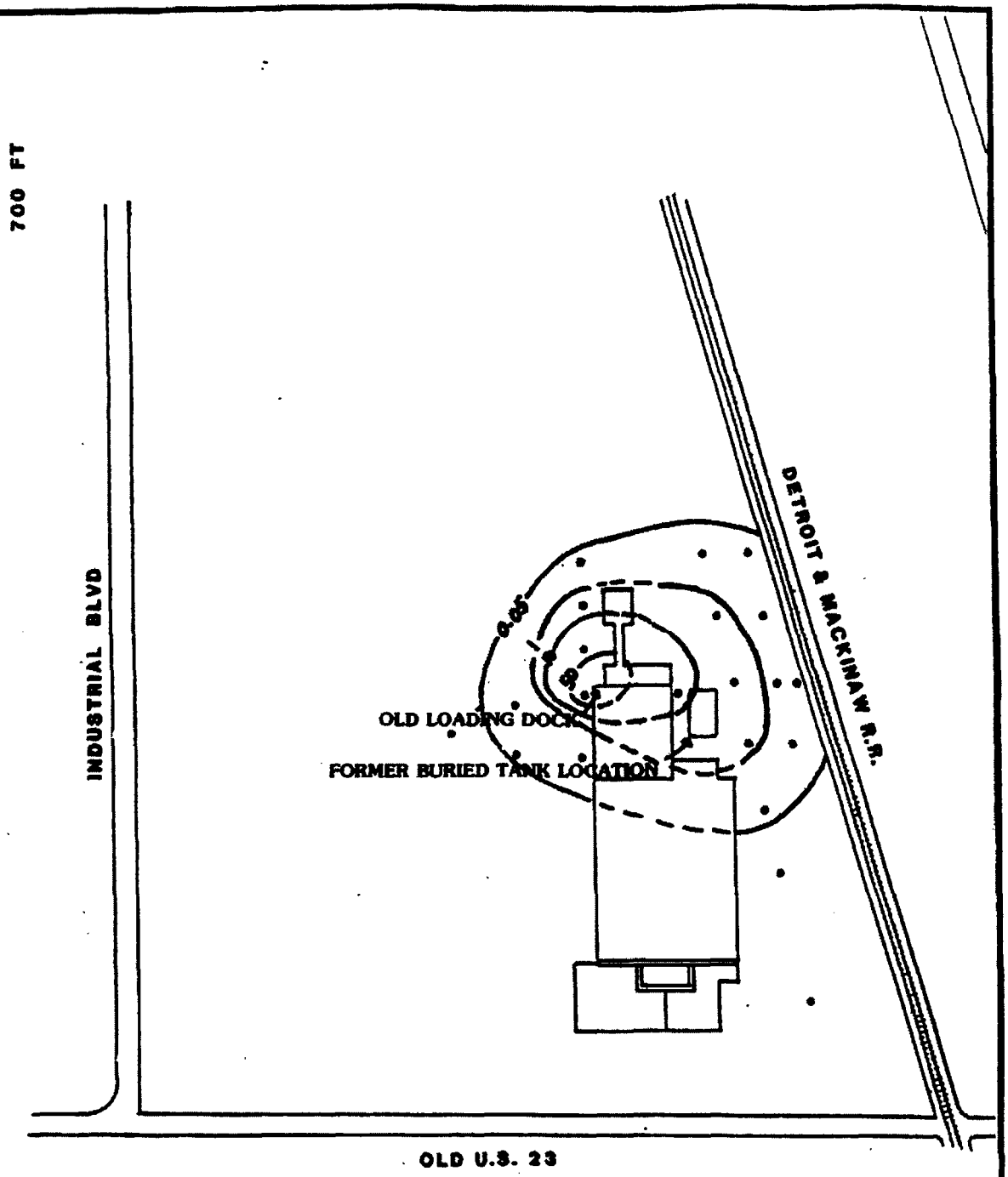
3.3 ASSOCIATED STUDIES

Additional tests were run as follows:

3.3.1 Variance of Concentration with Depth

A modified soil gas probe was used to obtain samples at 2, 4, 6, 8 and 10 foot depths from a point known to be inside the TCE plume. The following results were obtained:

Depth (feet)	TCE Concentration (ppm)
2	.124
4	.386
6	.729
8	1.107
10	1.979



HEDBLUM INDUSTRIES SITE

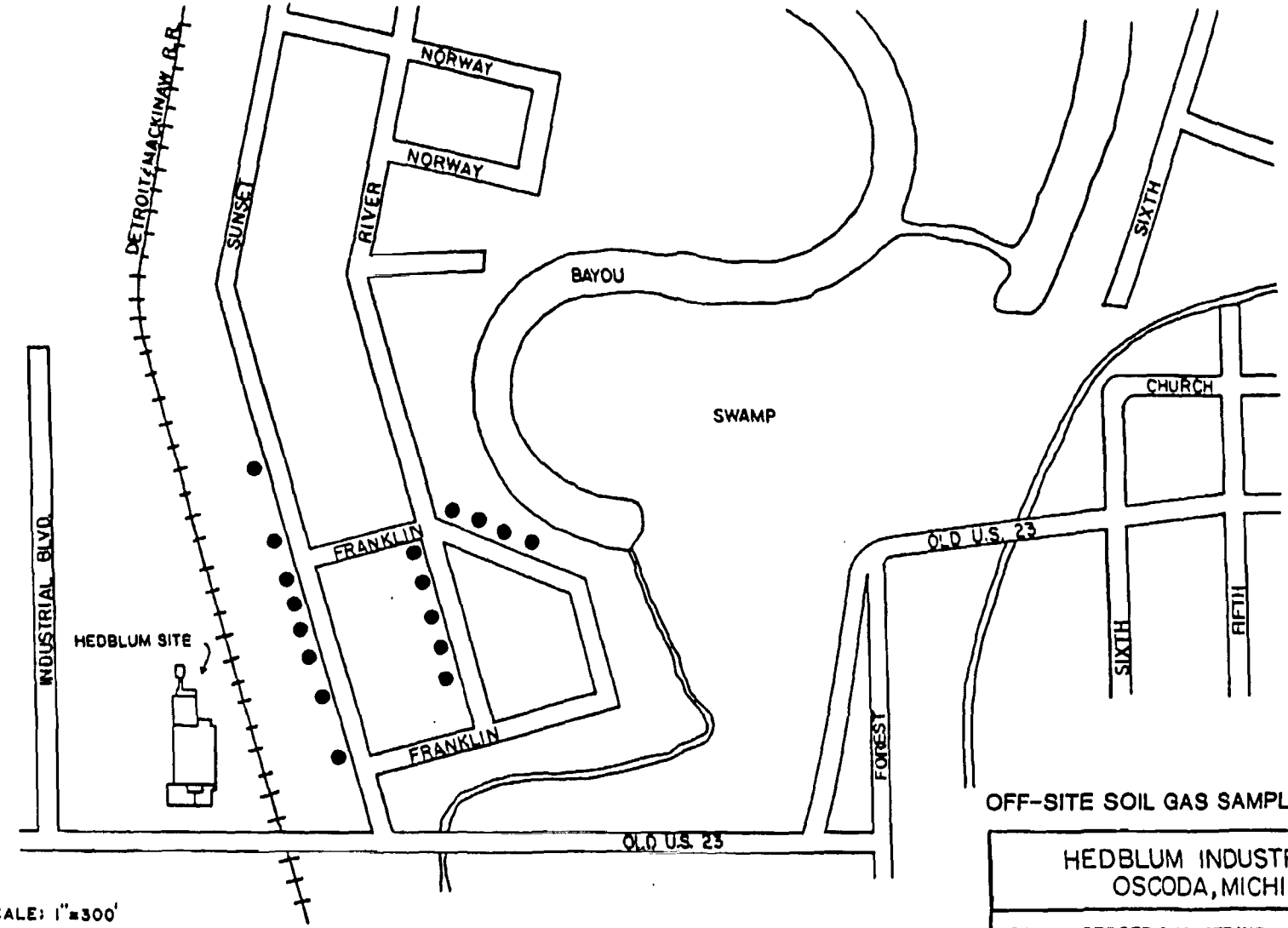
CONCENTRATION CONTOURS
FOR TCE IN SOIL GAS
(PPM)

NORTH

0 100
Approximate Scale, Ft.

CAMP DRESSER & McKEE INC.
200 West Adams
Suite 1600
Chicago, Ill. 60606
CDM

FIG. NO.
5



OFF-SITE SOIL GAS SAMPLING LOCATIONS ●

SCALE: 1"=300'

HEDBLUM INDUSTRIES SITE
OSCODA, MICHIGAN

CAMP DRESSER & McKEE INC.
200 West Adams Suite 1600
Chicago, Ill. 60606
CDM
environmental engineers, scientists, planners, & management consultants

FIG. NO. 6